

 **OZONE**

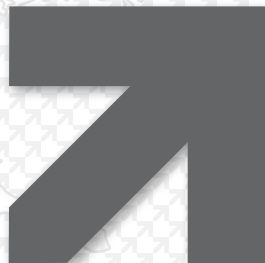
**VIPER3**



**VIPER3** MANUAL



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*VIPER3*





**T**hank you for choosing to fly an Ozone Viper 3.

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 Viper 3. It details information about the Viper 3'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 Viper 3, 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 Viper 3 for the first time.

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 Viper 3. 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 cause 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 VIPER 3

Replacing the successful Viper2, the Viper3 features several major improvements and innovations including the patented Ozone Shark Nose Technology and a new wing tip steering system.

The Viper 3 is a classic competition wing designed for advanced pilots. The new high-performance Shark Nose reflex profile is the most efficient profile used in PPG design to date. In a series of national competition wins in 2014, Ozone Team Pilot, Alex Mateos, proved the efficiency of this new wing by dominating the economy tasks. Thanks to its 3-line design, unsheathed lines, and new profile, the Viper 3 is highly efficient. In thermal conditions its behavior is similar to a paragliding wing, with very good climb and glide performance and with progressive and intuitive handling, it transmits moderate feedback to the pilot.

Although this new wing is surprisingly efficient, it is also very fast. The Viper 3's speed is easily accessible and it is not necessary to overpower the wing with a large engine to maintain level flight – the Viper 3 maintains excellent glide performance even in its most accelerated configurations.

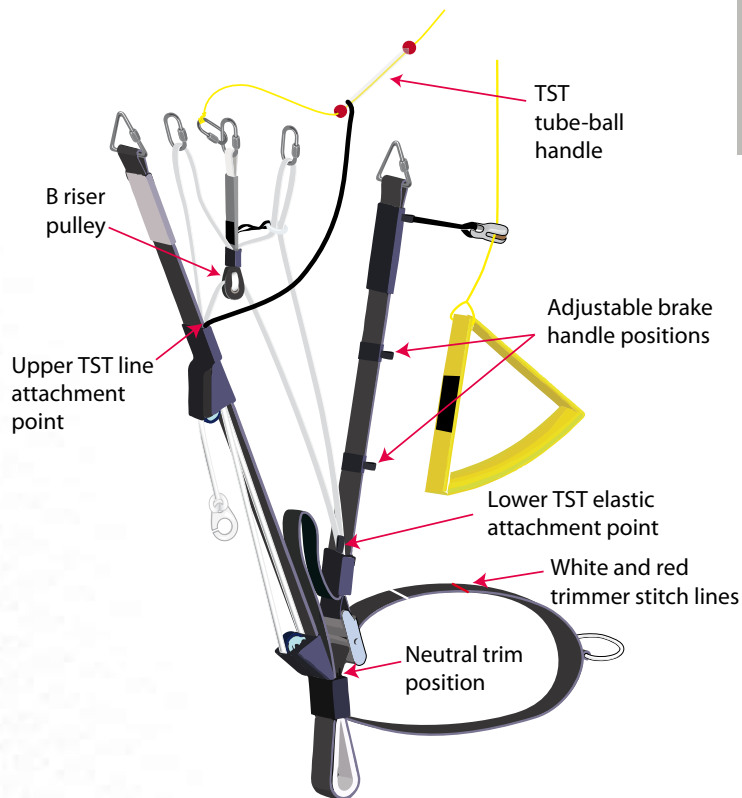
Viper and Viper 2 pilots will notice that the Viper 3 is tuned for performance flying more so than freestyle flying. While its handling is natural and it carves in an intuitive fashion, the Viper 3 is not a freestyle or slalom wing, and its core mission is performance flying.

This new design is aimed at highly experienced PPG pilots only, who are looking for a wing with high efficiency, the ability to climb easily in lifting air, and know how to handle a wing of this aspect ratio. It is recommended to fly the Viper 3 using a harness with low hang points, to allow weight shifting and active piloting. Experienced PG pilots who are looking for a more advanced crossover wing will also enjoy the Viper 3.

For more information on the Shark Nose and how it works, please visit our website.

## RISERS

The updated risers feature the new tip steering system; Trim tabs; adjustable brake pulley heights; ball bearing pulleys on the B risers for smooth acceleration and a huge accelerator range. The A riser is covered with a Grey coloured webbing for easy identification.



## ➤ Trimmers

The Viper 3 is supplied with a trim riser set. See page 5.

The slow trim setting, with the trimmers fully pulled is the neutral position. This is ideal for thermalling or when minimising sink rate. Brake pressure is lighter and the handling is at its best in the neutral or slow trim setting. Note, in this position the risers are NOT of equal lengths.

The trimmers have 2 stitch lines; the first (lowest) white stitch line is the best setting for the climb out, normal flight and for the best inflation behaviour during take-off. This is especially useful in light winds and/or at high altitudes.

To increase cruise speed you can use the speed system, further 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 fully slow (neutral) position whilst using the full range of the speed system.

The second RED stitch line is the limit for comfortable fast cruising and the limit for using the brakes without affecting stability too much. You can still use the brakes and exceed this setting when conditions are safe to do so, but in thermic or turbulent air we recommend closing the trimmers to the slow or neutral position or at least to the lowest white stitch line or accept a higher risk of collapse.

In turbulent air the reflex profile is very stable. It will resist reasonable levels of turbulence with a high resistance to collapse without active 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 application of the brakes whilst accelerated will reduce the inherent stability of the profile. However in very strong turbulence Ozone recommends to return the trimmers to the fully slow position and fly the glider actively. This way, you will be in the best position to react correctly

should an incident occur.

**NOTE: When the trimmers are fully pulled to the neutral position the risers are NOT of equal lengths.**

## ➤ Accelerator System

The riser's accelerator system now includes B riser pulleys. These reduce the overall friction for a lighter, smoother action. The light pressure allows for easier, more comfortable high speed cruising.

Using the speed system has exactly the same effect as releasing the trimmers. Either can be used in any combination to accelerate the wing, but be careful, fully accelerated with trimmers released is very fast!

To set up the 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 secondary (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. Ensure that the speed bar is secured in place before take off to avoid fouling the prop. 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.**

### ➤ 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 when necessary.

#### IMPORTANT:

- 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 or when controlling the wing with the TST.

### ➤ Adjustable Brake Pulley Position

The height of the brake line pulley can be adjusted according to pilot preference to suite the power unit's hang points height. There are 3 settings: Upper, Middle and Lower. The upper setting (as set by the factory) is for low hang point motors whilst the middle and lower settings are for units with higher hang points.

To adjust the pulley height, first remove the brake line from the pulley by taking off the brake handle; next remove the pulley line from the loop on the riser which is attached with a larks foot. Replace the pulley line on the desired loop using a larks foot and route the brake line through the pulley before attaching the brake handle (at the new adjusted length).

If you lower the pulley height, you must also lengthen the brake lines accordingly. Moving the pulleys to the middle setting requires

adding 10cm to the overall brake line length (measured from the mark on the brake line), using the lower setting requires an additional 20cm from the mark.

**IMPORTANT: If you adjust the brake pulley height, you MUST re lengthen the brake 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 (C-risers) or the tip steering system for directional control.**

### ➤ Tip Steering System

The all new Tip Steering System uses ergonomic handles to help better control the wing during high speed flight. Located on the risers, the tube-ball handles are easily accesible and linked to the very tips of the wing, giving you high levels of precision and comfort for high speed cruising or accurate low level carving, It allows for precise handling without the need to use the brakes.

When using the TST, it is not necessary to use large control movements to effect a turn. The tst line moves freely inside the tube so when you pull down the effect is doubled. Be progressive and gentle at first until you are familiar with the handling characteristics.

The attachment height of the new Tube-ball handle can be adjusted according to your comfort, flying style and motor unit. Attachment loops are located on the risers for easy mounting with the maillons. For high hang point motor units an extra, longer TST line is also included so that the system can be lowered to the lowest position.



For directional control whilst flying at full speed only use the tip

steering, DO NOT use the brakes alone. Application of brake when the wing is at a low angle of attack has a negative effect on the reflex profile: causing loss of precision, adverse roll, and reduced collapse resistance. In accelerated flight the tip steering system can be used for both directional control - to keep a straight heading and for effecting nice smooth turns. It becomes more precise the faster you fly.

When using the tip steering, it is advised to keep the brake handles in the hand. This is in case of an engine failure or loss of control. It is therefore necessary to ensure that the brake lines are adjusted in such a way that they are not activated when using the tip steering - make sure the brake and TST lines are set correctly.

**IMPORTANT: For take off and landing use only the brakes. In turbulent air use the brakes for directional, pitch and pressure control, DO NOT use the Tip Steering**

## 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 Viper 3 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. Due to the high performance profile of the Viper 3, a unit with a less powerful motor and low movable hang points may be advisable. 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. As with all new equipment; only fly in conditions that you would normally fly in, on a familiar site. Fly the wing progressively.

### ➤ Preparation

Lay out the Viper 3 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.

**Remember: 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. Trim set correctly
10. Prop clear of lines
11. Airspace and visibility clear





## ➤ Launching

Your Viper 3 will launch with either the forward or reverse launch techniques. It is best to adjust the trimmers to the lower white line position.

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.

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. Whilst inflating your wing, you should hold both of the A risers on each side.

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 Viper 3 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 Viper 3 is inflated correctly, progressively apply full power

and accelerate smoothly for the launch.

During a forward launch we advise to NOT use the power launch technique. During the inflation the power should be progressively applied once the wing is half way up. Applying the power too early may inhibit the inflation characteristics of the center part of the wing, causing the wing tips to come up faster.

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

**IMPORTANT: Lay out the wing in a pronounced arc with the center of the wing higher than the tips. DO NOT apply the power too early.**

### **Reverse Launch -Light to Strong Winds**

Lay out your Viper 3 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 Viper 3 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 Viper 3s 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 first white line position you will achieve the best climb rate. Do not attempt to climb too steeply or too quickly by using the brakes or slow trim. 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 Viper 3 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 weight shift 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 weight shift or adjusting the trims asymmetrically is the best method to correct this.

The handling characteristic of the Viper 3 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 Viper 3 will achieve very good straight line speeds whilst maintaining level flight with trims fully released and full speed bar applied. Be cautious when releasing the trimmers beyond the upper red line, only do so in calm conditions.

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 slow position.

By pulling the trimmers to the slow position and applying a small amount of brake, the Viper 3 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 Viper 3 your first turns should be gradual and progressive.

To make efficient and coordinated turns with the Viper 3 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 Shark nose 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 slow 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 slow neutral 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.

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 Viper 3 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 Viper 3 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 Viper 3 increases its sink rate. This is useful for staying out of cloud or descending quickly. To pull big ears on the Viper 3 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 accelerated 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 break-

ing strain of the lines leading to equipment failure!

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

### ➤ Wingovers/Aerobatics

The OZONE Viper 3 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. The load applied on the B lines during this manoeuvre is not very good for your wing; only use it in emergency situations.

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.

To exit the B-stall the B-risers should be released symmetrically and in one smooth, fast progressive motion. The glider will resume normal forward flight without further input. Check you have forward flight again before using the brakes. Do not release the B lines slowly, this may lead to a parachutal stall.

**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 Viper 3 in a series of tightening 360's it will enter a spiral dive. This will result in rapid height loss. It is likely that the wing has neutral, possibly unstable tendencies during the spiral dive which will require active piloting to return to normal flight.

Safe descent rates are possible but high speeds and high G-forces can build quickly leading to disorientation. Excessive G forces can lead to loss of consciousness. High descent rates increase the likelihood of the wing remaining neutral, possibly unstable in spiral.

**Ozone strongly recommends to not perform spiral dives with high descent rates.**

To initiate a spiral dive, look and lean in to the direction you want to turn and then smoothly apply the inside brake. The Viper 3 will first turn almost 360 degrees before it drops into the spiral (depending on the input). Once in the spiral you should apply a little outside brake to keep the outer wing tip pressured and inflated.

To exit the spiral dive, weight shift away from the direction of rotation and smoothly release the inside brake. As the Viper 3 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.

Always be prepared to pilot the wing out of a spiral dive. In case of neutrality/instability use opposite weight shift and smoothly apply enough outside brake to provoke the glider to exit the spiral.

**IMPORTANT: The Viper 3 is a small and dynamic wing, the entrance of the Spiral dives is very quick and the sink rate high. Spiral dives are dangerous and put unnecessary strain on the glider, they cause disorientation and need time and height to recover.**

**Do not perform this manoeuvre near the to 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, or at least not to fly into them... Asymmetric collapses can be controlled by weight shifting away from the collapse and applying a small amount of brake to control your direction. This act will most of the time be enough for a full recovery of the wing.

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 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 normally reinflate without pilot input, however 15 to 20cm of brake applied symmetrically will speed the process.

If your wing collapses in accelerated flight, immediately release the accelerator and pull the trimmers to the slow or neutral position before attempting to reinflate the canopy.

### ➤ 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 (attached to the C 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 cravat 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, aerobic 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'.

Should it happen, your first reaction should be to fully raise both brakes, this action alone normally allows the glider to return to normal flight. If nothing happens after a few seconds, apply the speed bar or release the trimmers to regain normal flight.

Ensure the glider has returned to normal flight (check your airspeed) before using 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: Never fly in rain or with a wet wing, this will significantly increase the likelihood of parachutal stall. If you are accidentally caught-out in a rain shower, land immediately. DO NOT use big ears as a descent technique; big ears with a wet wing will further increase the chances of a parachutal stall occurring. Instead, lose height with gentle 360's and make sure to consider your air speed during final approach, use a small amount of speed bar if necessary.**

## TRIKE/TANDEM FLYING

The Viper 3 is for solo use only. It has not been designed as a tandem wing or to be used with a trike.

**Do NOT use the Viper 3 for tandem flights or with a trike.**







# PACKING

## ➤ Packing

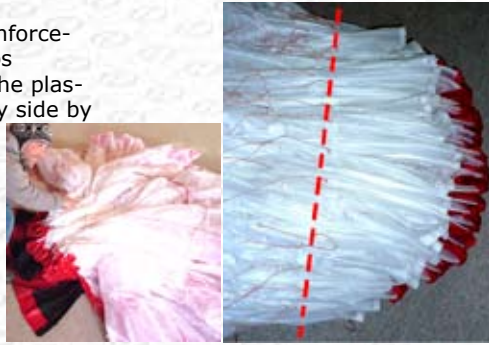
To prolong the life of your wing and to keep the plastic reinforcements in the best possible condition it is very important to pack the wing carefully.

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 Saucisse 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.**



## CARING FOR YOUR VIPER 3

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 Viper 3 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 (rocks, sand etc.) and ground handling in strong winds will accelerate the aging process.

It is recommended that you regularly CHECK your Viper 3, especially after a heavy period of use, after an incident or after a long period of storage.

### ➤ Cleaning

Any kind of wiping/scratching can damage the coating of the cloth. We recommend for cleaning your Viper 3, you use a soft cloth dampened only with water and to use gentle movements little by little across the surface.

**IMPORTANT: 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.

**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.

## 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 100 hours. However, if you are a frequent flyer (more than 80 hrs per year), then we recommend, that you get your glider checked after every 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 that confirms 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 Viper 3 was designed and trimmed to give the optimum balance of performance, handling and safety. Any modification means the glider will lose these qualities and probably become more difficult to fly.

**DO NOT modify your wing in any way.**

## 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](mailto: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 Viper 3.

Team Ozone

## MATERIALS

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

### ➤ Cloth

#### **Upper-surface**

Dominico DOKDO 30D MF

#### **Lower-surface**

Dominico DOKDO 30D MF

#### **Internal Ribs**

Dominico DOKDO 30D FM.

#### **Leading- edge reinforcement**

P18 plastic pipe

### ➤ Lines

#### **Lower cascade**

Edelrid 8000U - 90/130/190/230

#### **Middle Cascade**

Edelrid 8000U - 50/70/90/130

#### **Upper cascades**

Edelrid 8000U - 50/70/90

### ➤ Risers and hardware

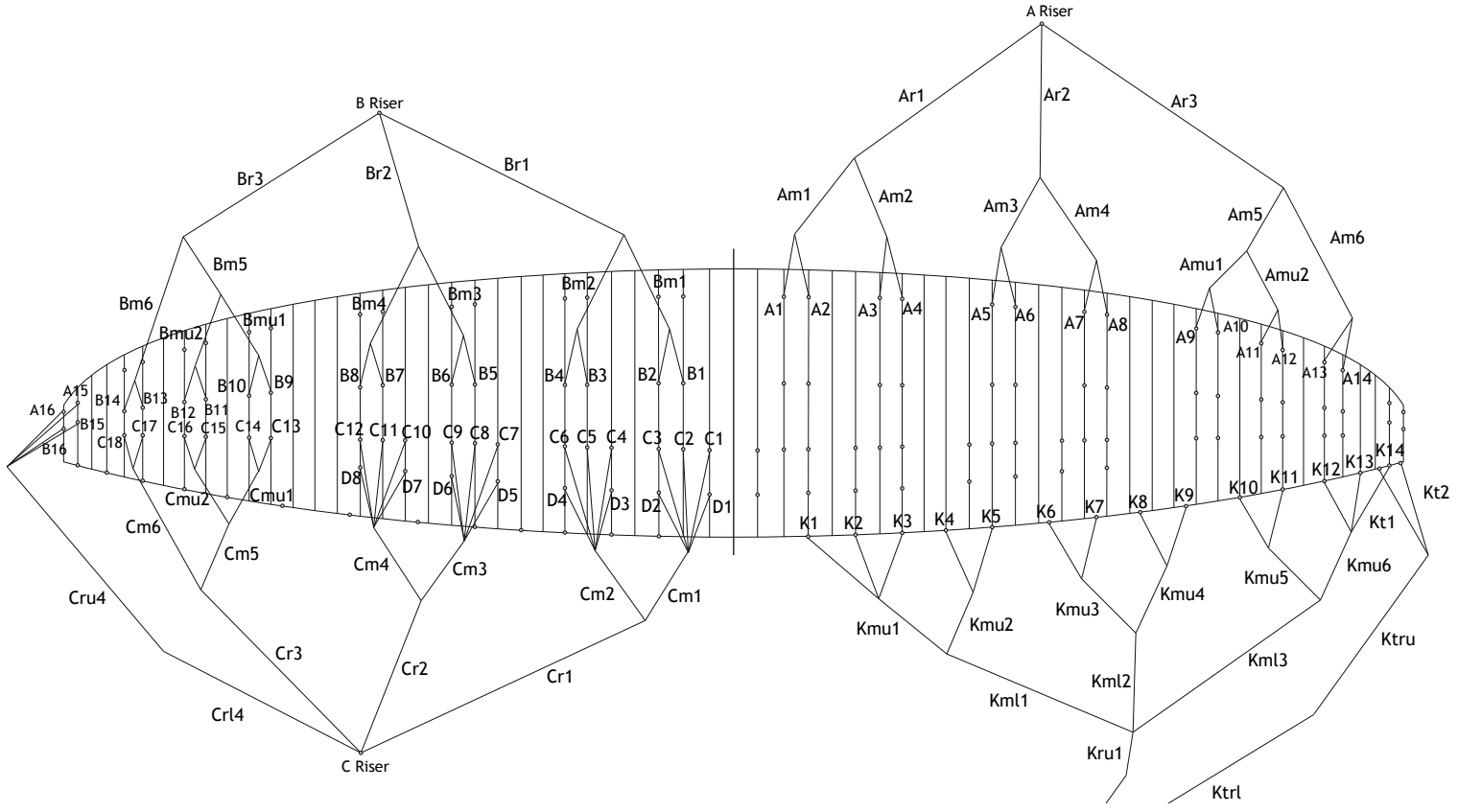
**Shackles** - High quality micro maillons from Maillon Rapide.

**Riser webbing** - 20mm zero stretch polyester webbing.

**Pulleys** - Ronstan ball bearing



# LINE DIAGRAM



## TECHNICAL SPECIFICATIONS

	20	22	24	26
No. of Cells	62	62	62	62
Flat Area (m2)	20	22	24	26
Projected Area (m2)	17.1	18.8	20.5	22.2
Projected Span (m)	8.72	9.14	9.55	9.94
Flat Span (m)	10.94	11.47	11.98	12.47
Projected Aspect Ratio	4.45	4.45	4.45	4.45
Flat Aspect Ratio	6	6	6	6
Root Chord	2.31	2.42	2.53	2.63
Glider Weight (Kg)	4.7	5.1	5.5	5.9
Total Free Flight Weight Range (Kgs)	65 - 85	75 - 95	85 - 105	95 - 115
Total PPG Weight Range (Kgs)	75 - 105	85 - 115	95 - 125	105 - 140
Certification	DGAC	DGAC	DGAC	DGAC
Load test (Max Kgs)	147	147	147	147

*VIPER3*

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