GIN

FALCON
User manual and servicing

v1.0, 26.02.2016

WARNING

Read manual before first flight!
Paramotoring is a potentially dangerous sport that can cause serious injury including bodily harm, paralysis and death.
Flying a GIN paramotor wing is undertaken with the full knowledge that paramotoring involves risks.

Thank you...

...for choosing Gin Gliders. We are confident you'll enjoy many rewarding experiences in the air with your GIN Falcon.

This manual contains important safety, performance and maintenance information. Read it before your first flight, keep it for reference, and please pass it on to the new owner if you ever re-sell your paramotor glider.

Any updates to this manual, or relevant safety information, will be published on our website: www.gingliders.com.

You can also register for e-mail updates via our website.

Happy flying and safe landings,
GIN Team

Table of Contents

1. Introduction

About Gin Gliders

Dream

In forming Gin Gliders, designer and competition pilot Gin Seok Song had one simple dream: to make the best possible paragliding equipment that pilots all over the world would love to fly—whatever their ambitions.

At Gin Gliders, we bring together consultant aerodynamists, world cup pilots, engineers and paragliding school instructors, all with one goal: creating better paramotor gliders.

Touch

We're a "hands-on" company that puts continuous innovation and development at the centre of everything we do.

At our purpose-built R&D workshop at head office in Korea, we are able to design, manufacture, test-fly and modify prototypes all in a matter of hours. Our international R&D team is on hand both in Korea and at locations worldwide. This guarantees that your equipment has been thoroughly tested to cope with the toughest flying conditions.

Our own production facilities in East Asia ensure the quality of the finished product and also the well-being of our production staff.

Believe

We believe that the product should speak for itself. Only by flying can the pilot understand the wing and develop trust and confidence in it. From this feeling comes safety, comfort, performance and fun. The grin when you land should say it all!

Manual

We recommend that you familiarise yourself with your new paramotor glider by reading this Manual before your first flight. This will allow you to acquaint yourself its new functions, to learn the best way to fly the paramotor glider in various situations, and explain how to get the best out of your paramotor glider. Information in this Manual on design of the paramotor glider, technical data and illustrations are subject to change. We reserve the right to make changes without prior notification.

The Manual complies with the airworthiness DGAC requirements and forms part of the certification. There are a total of four important parts to the Manual, which give the following information:

1. *Manual (this document):*
   Instructions on getting started and using the paramotor glider
2. *Inspection Information:*
   General instructions and guidance on carrying out the regular inspection of paramotor gliders
3. *DGAC documents:*
   'Fiche d'identification' and 'Test en vol'
4. *Glider details*
   Pilot details, proof of ownership and inspections and repairs overview

This Manual was current at the time of going to print and can be downloaded from GIN's website prior to print.

Gin Gliders Homepage

Gin Gliders has a comprehensive website, which provides additional information about the Falcon, any updates to the Manual and many other issues related to paragliding. GIN's website is the first port of call for GIN's worldwide following:

www.gingliders.com

WARNING

Sections of text headed 'Warning' indicate that there is a risk of injury.

IMPORTANT

Sections of text headed 'Important' indicate that there is a risk of material damage.

Tip

Sections of text headed 'Tip' give advice or tips which will make it easier to use your paramotor glider.

On Gin Gliders website, you will find an extensive range of accessories for your paramotor glider, useful products for pilots, as well as additional information and accessories for your Falcon

You will also find links there to other services and websites:

- *Gin Gliders Shops*
- *Facebook, Twitter & YouTube*

These websites and their content are provided for your use. The content of Gin Gliders websites has been made available for your use on an "as is" and "as available" basis. Gin Gliders reserves the right to alter the websites at any time or to block access to them.

Gin Gliders and the environment

Protection of the environment, safety and quality are the three basic values of Gin Gliders and these have implications on everything we do. We also believe that our customers share our environmental awareness.

Respect for nature and the environment

You can easily play a part in protection of the environment by practising our sport in such a way that there is no damage to nature and the areas in which we fly. Keep to marked trails, take your rubbish away with you, refrain from making unnecessary noise and respect the sensitive biological equilibrium of nature. In particular, avoid flying at low altitude under motor over residential areas and nature reserves.

Paragliding is, of course, an outdoor sport – protect and preserve our planet's resources.

Environmentally-friendly recycling

Gin Gliders gives consideration to the entire life cycle of its paramotor gliders, the last stage of which is recycling in an environmentally-friendly manner. The synthetic materials used in a paramotor glider must be disposed of properly.

Tip

If you are not able to arrange appropriate disposal, Gin Gliders will be happy to recycle the paramotor glider for you. Send the glider with a short note to this effect to the address given in the Appendix.

2. Safety

Safety advice

Flying a paramotor demand a high level of individual responsibility. Prudence and risk-awareness are basic requirements for the safe practice of the sport, for the very reason that it is so easy to learn and practically anyone can do so. Carelessness and overestimating one's own abilities can quickly lead to critical situations. A reliable assessment of conditions for flying is particularly important. Paramotor gliders are not designed to be flown in turbulent weather. Most serious accidents with paramotor gliders are caused by pilots misjudging the weather for flying.

In Germany, paramotor gliders are subject to the guidelines for air sports equipment and must not under any circumstances be flown without a valid certification. Independent experimentation is strictly prohibited. This Manual does not replace the need to attend training at a paramotor school.

The Manual must be passed on to any new owner if the paramotor glider is sold. It is part of the certification and belongs with the paramotor glider.

Observe the other specific safety advice in the various sections of this Manual.

Safety notices

Safety notices are issued when defects arise during use of a paramotor glider which could possibly also affect other gliders of the same model. The notices contain instructions on how the affected gliders can be inspected for possible faults and the steps required to rectify them.

Gin Gliders publishes on its website any technical safety notices and airworthiness instructions which are issued in respect of GIN products. The paramotor glider owner is responsible for carrying out the action required by the safety notice.

Safety notices are issued by the certification agencies and also published on the relevant websites. You should therefore visit on a regular basis the safety pages of the certification

WARNING

The safety advices and instructions contained in this Manual must be followed in all circumstances. Failure to do so shall render invalid the certification and/or result in loss of insurance cover, and could lead to serious injuries or even death.

agencies and keep up-to-date with new safety notices which cover any products relating to paragliding.

Liability, warranty exclusion and operating limitations

Use of the paramotor glider is at the pilot's own risk!

The manufacturer cannot be held liable for any personal injury or material damage which arises in connection with GIN paramotor gliders. The certification and warranty shall be rendered invalid if there are changes of any kind (incl. paramotor glider design or changes to the brake lines beyond the permissible tolerance levels) or incorrect repairs to the glider, or if any inspections are missed (annual and 2-yearly check).

Pilots are responsible for their own safety and must ensure that the airworthiness of the glider is checked prior to every flight. The pilot should launch only if the paramotor glider is airworthy. In addition, when flying outside of Germany, pilots must observe the relevant regulations in each country.

The glider may only be used if the pilot has a licence which is valid for the area or is flying under the supervision of an approved flying instructor. There shall be no liability on the part of third parties, in particular the manufacturer and the dealer.

Liability and warranty exclusion

In terms of the warranty and guarantee conditions, the paramotor glider may not be flown if any of the following situations exists:

- *the inspection period has expired, or the inspection has been carried out by the pilot him/herself or by an unauthorised inspector*
- *the pilot has incorrect or inadequate equipment (reserve, protection, helmet etc)*
- *the glider is used in combination with a motor which has not been tested for compatibility*
- *the pilot has insufficient experience or training*

Operating limitations

The paramotor glider must be operated only within the operating limits. These are exceeded, if one or more of the following points are complied:

- *the take-off weight is not within the permissible weight range*
- *the glider is flown in rain or drizzle, cloud, fog and / or snow*
- *the canopy is wet*
- *there are turbulent weather conditions or wind speeds on launch higher than 2/3 of the maximum flyable airspeed of the glider (varies according to the total take-off weight)*
- *air temperature below -10°C and above 50°C*
- *the glider is used for aerobatics/extreme flying or flight manoeuvres at an angle greater than 90°*
- *there have been modifications to the canopy, lines or risers which have not been approve*

Glider categories and guidelines

The complexity of the paramotor glider system means that it is not possible to give any more than a partial description of the glider's flight behaviour and reactions to disturbances. Even a small alteration in individual parameters can result in flight behaviour which is markedly modified and different from the description given.

DAGC certification

The Falcon is registered with the DGAC as ULM Class 1.

Description of flight characteristics

Paramotor glider with a moderate level of passive safety and potentially dynamic reactions to turbulence, canopy problems and pilot error. Recovery may require precise pilot input.

Target group and recommended flying experience

Gin Gliders recommend that paramotor wing pilots meet the following minimum requirements before flying the Falcon:

WARNING

The descriptions of flight characteristics contained in this Manual are all based on experiences from the test flights, which were carried out under standardised conditions. The classification is merely a description of the reactions to these standard tests.

- *extensive flying experience of at least 75 hours airtime per year*
- *extensive knowledge of the special features of paragliders with reflex profiles*

The Falcon is not suitable as a wing for beginner paramotor pilots. On the contrary, pilots should already have experience with paramotor wings and be familiar with the performance and safety of gliders with reflex profiles.

The Falcon covers many aspects of powered paragliding and offers various adjustment options according to the pilot's wishes. The adjustments require appropriate experience on the part of the pilot, in order to use the Falcon's full range of performance and handling.

Description of pilot skills required

Designed for pilots well versed in techniques to recover from abnormal flying conditions, who fly regularly, "actively", and who understand the possible implications of flying a paraglider with reduced passive safety.

Reflex profiles require a correct assessment of operating limits in order to avoid canopy disturbances safely.

Suitability for training

The Falcon is generally not suitable for use as a training paramotor glider.

Before the first flight

Certified Harnesses

The harness and reserve used must receive a declaration of conformity and be registered by a type-testing body.

To achieve a satisfactory level of performance with the Falcon, it is essential to give conscientious thought and consideration to the appropriate harness, motor and propeller. We are able to give no more than advice on this. The pilot is responsible for the final decision.

Please contact your Gin Gliders dealer or Gin Gliders directly if you have any questions about using your harness and motor with the Falcon.

WARNING

Your instructor, dealer or a specialist must test-fly and inspect the paramotor glider before your first flight. The test-flight must be recorded on the paramotor glider information label. Any changes or improper repairs to this paramotor glider shall render invalid the certification and warranty.

Reserve

It is a mandatory requirement to carry an approved reserve for use in emergency situations where the paramotor glider fails and recovery is not possible, for example after colliding with another aerial sports craft. In choosing a reserve, you should be careful that you remain within the specified take-off weight. The reserve is fitted according to the manufacturer's instructions.

Weight Range

Be sure to fly your glider within the certified weight range given in the Technical Specification section. If you are choosing between 2 sizes, choose your optimum wing loading according to your personal preferences and the conditions you fly in. If you prefer dynamic flight behaviour with fast reactions, you should fly at a high wing-loading, i.e. choose the smaller model.

The dynamics are reduced in the middle and lower part of the weight range. Flight behaviour becomes more straightforward and many pilots fly with this wing loading. If these features appeal to you, you should fly with a lower wing-loading and choose the larger model.

The Falcon reacts to weight changes only by slightly increasing or reducing trim speed, with little noticeable effect on glide performance. You can therefore choose the size completely according to your own flying style.

First Flight

Carry out your first flights only during stable weather, in a familiar area or on a training slope. You should steer gently and carefully to begin with so that you can become accustomed to the reactions of the glider without stress.

Tip

Check your total flying weight by standing on weighing scales with all your equipment packed into your rucksack. Remember that ballast can also be used to adjust wing loading to the conditions.

3. Flying the Falcon

Gin Gliders cannot guarantee that the behaviour described below always applies one hundred per cent to all conceivable combinations of motor and glider. Compatibility of a new combination must therefore be confirmed by a test flight by an accredited compatibility test pilot.

An application for a compatibility test can be made to a type-testing body either by the manufacturer of the motor or by a pilot (as an individual type-test certification).

Preparation for launch

A careful pre-flight check is required for any type of aircraft. Make sure that you exercise the same level of care each time carry out the check. Following a consistent method of preparation and pre-flight checks is vital for safe flying. We recommend the following:

- *On arrival at the flying site, assess the suitability of the conditions: wind speed and direction, airspace, turbulence and thermal cycles.*
- *Inspect your motor (pre-flight inspection), glider, harness, reserve handle and pin, helmet and any other equipment.*
- *Choose a sufficiently large take-off area with even ground and no obstacles.*
- *Lay the glider out according to the plan form, and get the lines and risers sorted out.*
- *Connect the risers to your harness carabiners, ensuring there are no twists or loops around the lines. Check if the brake lines are adjusted to the correct length of your harness/motor unit!*
- *Connect the speed system to the risers with the Brummel hooks.*
- *Put your helmet on. Secure yourself in your harness and don't forget the leg loops!*
- *Do a final line check by pulling gently on the risers or lines to ensure there are no new knots, tangles or interfering branches or rocks. Take extra care in nil or light winds.*

WARNING

If there are obvious folds in the glider because it has been tightly packed or stored away for a long time, then the pilot should carry out some practice inflations before first launch and smooth out the trailing edge a little. This ensures that the flow profile is correct during launch. It is particularly important in low temperatures that the trailing edge is smoothed out.

Launch check

The launch check is carried out immediately before launch to check once again the most important safety points. It should always be carried out in the same sequence so that nothing is overlooked. The points are:

1. *Is personal equipment correct (motor, harness, carabiners, reserve, helmet) and are all straps done up?*
2. *Is the canopy arranged in a half-moon shape and are all the air-entrances open?*
3. *Are all the lines untangled and are any lines under the canopy?*
4. *Has the trimmer position been correctly chosen?*
5. *Is the propeller clear and the motor running properly?*
6. *Does the weather, in particular wind direction and strength, allow a safe flight?*
7. *Are the airspace and launch area clear*

Launch

The key to a successful launch technique is to practice ground handling on flat ground whenever you can. The Falcon has good launch characteristics for its class, and no special launch techniques are required.

Light or nil wind launch

The Falcon inflates steadily in nil-wind conditions. Simply guide the glider by taking the A1 and A2 main lines just above the A1 riser, keeping your arms bent and hands at the level of the shoulders. Allow your arms to rise in an arc and wait for the glider to inflate and come above your head - do not push the risers. There is no need to pull the risers hard.

Avoid moving your upper body sideways when the glider is rising, as this could cause lines to get caught in the propeller. If the glider is not centered when it rises, correct it using the risers rather than the brakes. This will stop one side of the glider tipping away. It is important during the take-off phase to remain under the glider and to hold your launch direction. When there is equal tension on both risers and the glider is above the pilot, check that the canopy is fully

inflated and that no lines are twisted or caught up. Do not stand still, but keep your upper body still when doing this.

If the glider goes too far to the side or falls down again, then stop the motor and begin the launch procedure again.

After carrying out the visual inspection, use full throttle. Leaning back slightly helps launch, as the full engine power is used. Release the risers and accelerate until the Falcon takes off. Take note of the following points during a forwards launch:

- *If the cage for the motor is not firmly in place, the risers can shift it during takeoff and press it against the propeller - make sure this has not happened before you fly at maximum power.*
- *During launch, use of the brakes should be smooth and moderate.*
- *The profile is inherently stable which means that the canopy continues to fly forwards after reaching its apex, so the glider must be braked no later than here.*
- *Do not launch until the glider is above, accelerating too quickly can cause dangerous pendulum motions.*
- *Do not get into your harness until you are a couple of meters in the air.*
- *Lower hang points with back motors generally allow an easier launch.*

Strong wind launch

The Falcon is very suitable for reverse launching. The pilot turns around to face the glider with the updraft coming from behind. This method of launch makes it easier for the pilot to control the rising of the canopy and to carry out fine-tuning, so is therefore recommended in strong winds.

If you wish, you can first clip in to the glider as in a forwards launch and then turn around while the motor is switched off. Guide the lines over the cage and check that none of the lines is caught up. In very strong winds, we recommend that you attach yourself to the glider when facing backwards. The risers must be set out and attached in such a way that you are in the correct position after you turn around and are not twisted.

By pulling on the front A-lines, the canopy begins to rise above the pilot as in a forwards launch. When the canopy reaches its apex, the pilot must turn around into the direction of flight and can run into the wind and take off. As with a forward launch the correct combination of brake and throttle is important to achieve the best speed and climb.

With the reverse launch, you should observe the following special features in addition to the points given under "Light or nil wind launch":

- *With the reverse launch, the correct technique for clipping in, inflation, and turning around is very important. The pilot must master these before points before attempting them with the motor running.*
- *Always turn around steadily and briskly into the right direction.*
- *Always check when clipping in with risers crossed, that they are not swapped over or twisted in the carabiners.*

Line knots or tangles

If you do take off with a line knot or tangle, try to get clear of the ground and any traffic before taking corrective action. Weight shift and/or counter brake to the opposite side and pump the knotted side with your brake. Be careful not to fly too slowly to avoid a stall or spin. If the knot or tangle is too tight to pump out, immediately fly to the landing zone and land safely.

Climbing

Once you are airborne, you may notice the counter-torque i.e. the glider wants to turn against the direction in which the propeller is turning. Focus on a fixed point in the distance and maintain your direction by counter-steering.

After launch, first fly into the wind and let the Falcon pick up speed. The Falcon increased speed range means that you must be particularly careful especially during your first flights.

Do not climb with too great an angle of attack. Select the rev speed and brake line use so that there is enough speed to keep adequate reserve to stall point.

If the angle of attack is too high when you are climbing, the glider could stall if there is any

further increase in the angle of attack e.g. a vertical gust. A further reason for keeping the climb gentle is to mitigate the effect of motor failure at low altitude. If this happens, you should always be in a position where you are able to land safely.

Counter-torque oscillation

Certain combinations of take-off weight, thrust from the motor and propeller size can cause pendulum motions. If this happens, the pilot can be pushed to one side during flight because of the counter-torque and the gyroscope effect. The pilot then swings back into his original position because of his weight, only to then swing up even further.

The pilot can do the following to counter the pendulum motion:

- *alter the throttle setting*
- *counter the pendulum effect by pulling slightly on the brakes*
- *weight-shift in the harness and/or adjust the harness position if it has suitable adjustment options (cross-strap)*

Pendulum motions generally occur at high revs and if the propeller has a large diameter. Attempts to steer by the pilot can increase the pendulum motion if they are over-exaggerated and not synchronised. If there are uncontrolled pendulum motions, the pilot should simply reduce speed and not steer at all.

Countering the torque effect

Engine torque always causes turning during flight in paramotoring. The Falcon has a torque compensator so that it is not necessary to counter-steer constantly. Further information and how to use the torque compansator are described in the "Riser" section.

In addition the trimmer can be closed or open to counter the torque effect of the motor.

Level flight and best glide

When the brakes are open, the Falcon flight is stable and level. The brake lines can be used to adjust the speed according to the flight situation, to ensure the optimum level of performance and safety. Flying too slowly close to stall speed increases the risk of an unintentional

asymmetric or full stall. This speed range should therefore be avoided and used only on landing.

The theoretical best glide speed in calm air is realized at the hands-off position. Minimum sink is reached by pulling approx. 10 cm of brake. If the brakes are pulled more, the sink does not reduce any further, the control pressures increase noticeably and the pilot reaches minimum speed.

Braking on both sides with the main brake with the trimmers open creates an extremely unstable profile and there is a risk of front stall or other extreme flight manoeuvres. Braking in accelerated flight is therefore forbidden!

Trim and accelerated flight (using the Trimmers and Speed Bar)

Trim Speed

The Falcon has a high basic trim speed even with neutral trimmer position, and this can be increased considerably by using the additional speed system and the trimmers. This gives the pilot a wide speed range, with which to make the ideal adjustment to cruise speed.

Accelerated speed

Once you have become accustomed to flying the Falcon, you can practice using the trimmer and speed system. To understand correct trimmer usage, study the diagrams showing trim and speed bar movement as well as speed bar hook-ups. The diagrams also illustrate how different trimmer settings affect the airfoil shape, and how changes in the Centre of Pressure (CP) influence pitch stability.

The Falcon's Reflex wing section is unique - it has a remarkably wide and relatively safe speed range. On the slower settings, sink rate improves dramatically and brake pressures are light. This enables you to make the best use of thermal cores. You will also have improved climb rate and shorter, slower take-offs and landings. See diagram RTR below describing differences in turning.

On faster trim or speed bar settings, brake pressures generally increase and weight-shift or wing tip steering becomes safer and more effective. With the trimmers fully off, the wing's speed and stability increases and its ability to cut through turbulence and cover distance improves.

WARNING

When flying accelerated the glider reacts much faster to a collapse. Also the glider reacts more radically when a collapse occurs during accelerated flight compared to flying at trim speed.
Flying at maximum and minimum speed should only be done with sufficient altitude and experience. Avoid flying accelerated near the ground, and be careful using the accelerator in turbulence.
If you do encounter a collapse while using the accelerator, immediately step off the bar completely before taking any other corrective actions.

IMPORTANT

Trimmer and speed bar settings are additional points to include in your pre-flight checklist!
If the setting is not symmetrical, the paraglider will turn in flight. And if you inadvertently release the trimmers, the Reflex profile of the Falcon will keep your wing level, so after hitting the throttle you will descend with increased speed instead of climbing as intended.

Make sure that you explore the full flight envelope only at a safe height and with adequate raining and experience.

Standard brake system with wing tip brake

With the Falcon, Gin Gliders has developed a glider that reacts immediately to steering input and is extremely responsive. The Falcon climbs best in turns when it is flown with sufficient speed and with weight-shifting. Too much braking increases the sink rate.

As more brake is applied, the bank attitude increases and the glider will fly a fast turn, increasing in steepness. This will eventually become a spiral dive (see the section "Spiral Dive").

The standrd steering system allows aggressive turns even at full speed without altering the Reflex profile.

To steer with the wing tip brakes, use the additional elastic line. The line is attached to the D-riser by a slider. This gives you three different types of steering:

1. *Steering with the main brakes*
2. *Steering with the main brakes and the wing tip brake*
3. *Steering with the wing tip brake*

Irrespective of the current configuration of the glider and its speed, you can fly tighter and more efficient turns by co-ordinated use of the brakes. There is less loss of altitude with gentle use of the outside brake coupled with pronounced use of the inside brake.

Take the time to perfect the use of the various brakes, and you will maximize your potential to fly efficient turns, perfectly in tune with the motor and trimmer adjustment.

2D steering with different speed configurations

The standard brake system and wing tip brake is the normal configuration of the Falcon. This system offers a wide range of possibilities and should be the best choice for most pilots. In addition, an optional 2D steering may be added. This is recommended only for very experienced pilots. Please contact your local dealer if you are considering changing the brake of your Falcon.

In general, when flown with the higher hang-point motor units, the wing has more of a tendency to dive when entering turns. This may also result in higher 'G' loadings in tight turns and a bigger swing effect when exiting manoeuvres. Weight shift is usually less effective with high hang-points. However, usually there is extra pendulum and lateral stability is gained.

WARNING

Braking on both sides with the main brake with the trimmers open (reflex mode) creates an extremely unstable profile and there is a risk of front stall or other extreme flight manoeuvres.
Braking in accelerated flight is therefore forbidden!
Flying too slowly close to stall speed increases the risk of an unintentional asymmetric or full stall. This speed range should therefore be avoided and used only on landing.

IMPORTANT

Applying brake tends to distort the shape of the wing, thus removing the Reflex character. This may cause the wing to become less stable.

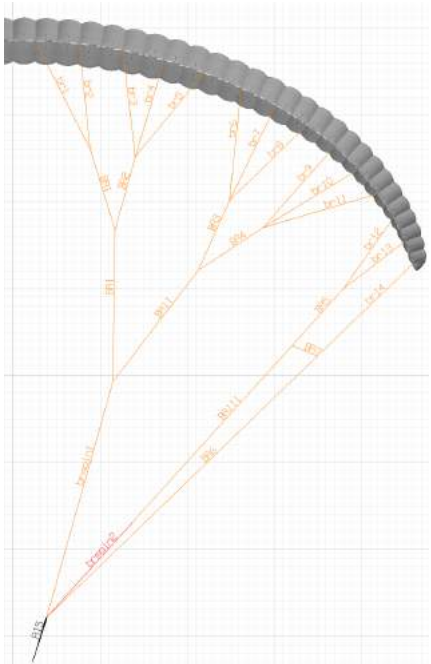


Fig. 1: *Brake outline for 2D steering*

2D steering is considerably different from the classic steering system. The possibilities it offers are of particular value to competition pilots. On one hand, the 2D system offers much more precise control of he canopy, but on the other it requires learning new (different) reflexes and reactions. A pilot must spend some time exploring the system and perfecting his own technique before flying 2D in a demanding competition environment.

Tip

As your skill improves at all speed settings the differential application of both brakes while banking will allow you to make very effective turns by increasing the lift to assist the turn when the lift axis is angled towards the bank. Likewise engine thrust and speed bar can be applied at certain times to increase turn rate etc. These techniques come with pilot experience and allow you to get the most from your wing and achieve fully coordinated, smooth turns, much like those possible on a three axis aircraft.

The following figures show the basic modes of steering with the 2D system. The demonstrated examples are far from comprehensive – there are a lot of transitional configurations. The most appropriate configuration for any given situation must be chosen by the pilot.

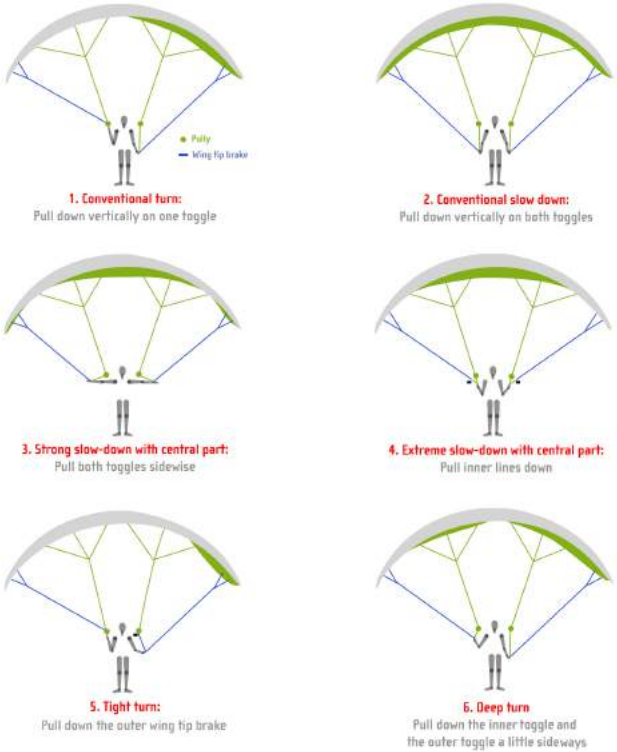


Fig.2: *Basic modes of steering with 2D system*

Different speed configurations and steerings

The following speed configurations and steerings can be delineated, according to trimmer settings and speed-system operation:

Slow (trimmers closed)

Steering is done with main brake handles. You can pull them straight down along your body or sideways, away from your body, thus differentiating the progression and bank angle.

1. *Straight down along your body - bigger progression, sharper turns.*
2. *Away from your body - lesser progression, turns with less banking.*
3. *Combined technique - "inner" hand along the body, "outer" hand moves away to keep the central part of the canopy solid and to stay ready for necessary corrections.*

Accelerated (trimmers open)

Steering is as described above, but significantly more force is needed. Consider grabbing the outer steering line above the handle. In this way, you will be steering mainly via the outer part of steering system.

On long transitions, using only the outer steering line or Tip Control Line is recommended.

Full speed (trimmers open and speed system activated)

Steering the Falcon with main brake handles at full speed configuration is not recommended! Attempts to use the main brakes will have no effect other than evoking collapses. As such, this is not dangerous. It will hardly even alter the flight path, given that the pilot won't be keeping the brakes down for long. However, this phenomenon is undesirable, unpleasant and - most of all - not effective as a means of directional correction.

It follows that steering at full speed should be done only with wingtip steering system. That system does not distort the reflex profile, and thus guarantees safe and efficient operation.

Flying with the Speed Release (SR) system

The SR system combines speed system with trimmers, resulting in automatic, smooth trimmer release on pressing the speedbar. In order to activate the system, you have to connect Power Attack hooks to the trimmer and release the trimmer tape accordingly, restricting its movement.

From this moment, the pilot can use entire range of the airfoil geometry and angle of attack (to the extent that the trimmer tape has been released).

These are basic guidelines only. As a whole, the combined 2D/Tipsteering system is very versatile and every pilot will find his own way to use it. However, before flying with this system, we strongly recommend getting fully acquainted with the Falcon over several hours of flight.

Various steering methodes with SR disabled and enabled

Steering with main brake handles only (slow or accelerated)

The main brake handle has different effects when pulled down vs. away.

Fig. 3a, b: *Steering with main brake handles only*

WARNING

Remember that the effects of the SR system can be dramatic, directly influencing your speed and sink rate. This can come as a surprise for inexperienced pilots, and is therefore potentially dangerous.

Main brake handles and outer line (accelerated)

Variable steering progression depending on degree of operation.

Steering with outer 2D steering line only (accelerated)

Main brake handles can be fixed on the magnets or let free. The following 4 pictures shows different ways to activate the outer 2D steering line (green line) with open trimmer and pushed speed system.

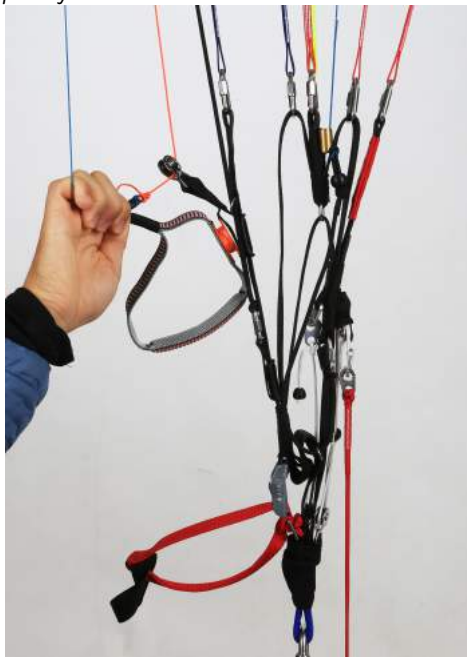


Fig. 4a, b, c, d: *Steering with outer 2D steering line only (Trim speed and accelerated)*

Steering with wing tip brake (recommended accelerated mode, required for full speed)

When fully accelerated, you should be steering the glider ONLY with the wing tip brake. Such steering does not deform the reflex airfoil, guaranteeing safety and effectiveness.

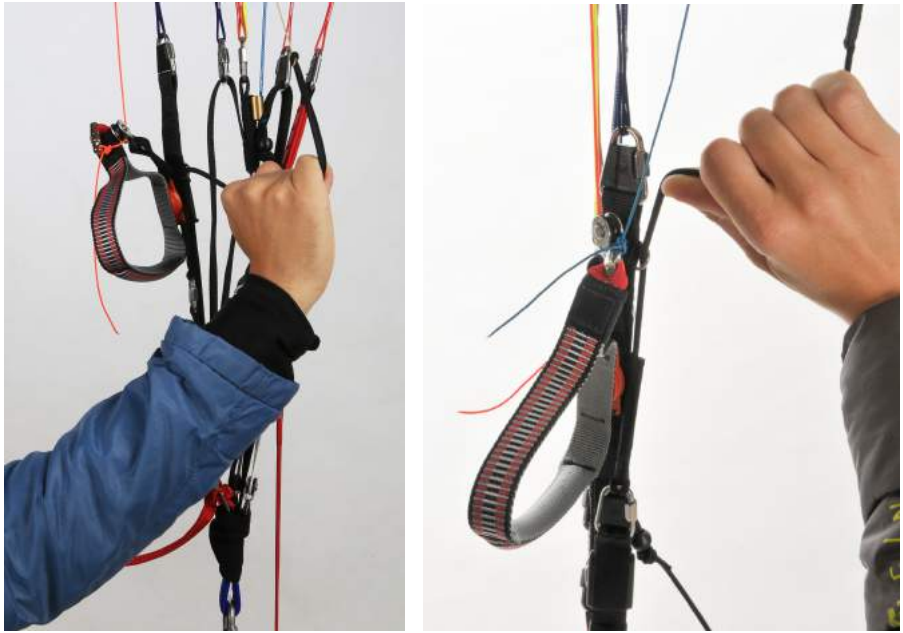


Fig. 5a, b: *Steering with wing tip brake*

Influence of classic steering on the reflex profile

Pilots used to classic paragliders tend to fly "active" style, with their brakes constantly tensioned. Flying a reflex wing like that is ineffective and is potentially dangerous.

A basic rule of reflex paramotoring is, "The more turbulent it is, the more the trims should be released and classic steering should be limited, especially with the speed system engaged."

In such instances, reflex paragliders are much more effectively steered by wingtip brakes designed specifically for that reason.

Released trims without brakes

Typical setting for fast and safe flying. Center of pressure (CoP) of the airfoil moves forward, practically excluding collapses. Pitching moment induced by the reflex airfoil increases angle of attack.

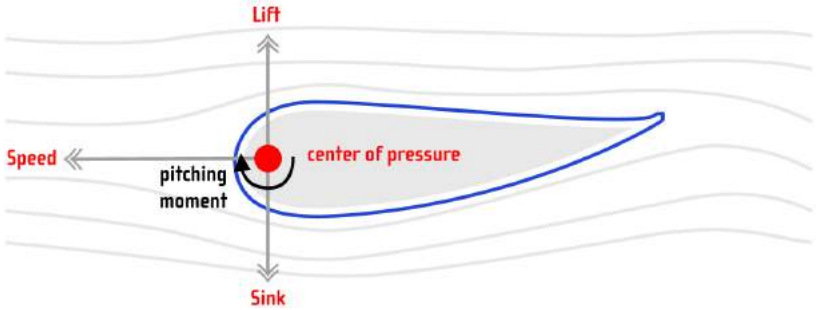


Fig. 6a: *CoP with released trims and without brakes*

Released trims with brakes applied

Even slight brakes application (especially in full speed bar) shifts the center of pressure back and due the lack of reflex on trailing edge, pitching moment decreases angle of attack. Additional turbulence behind the wing occurs. In some circumstances this lead to a collapse.

Using the brakes can be sometimes necessary for heading corrections, still you should keep your brakes free when flying ahead, otherwise the reflex feature doesn't work.

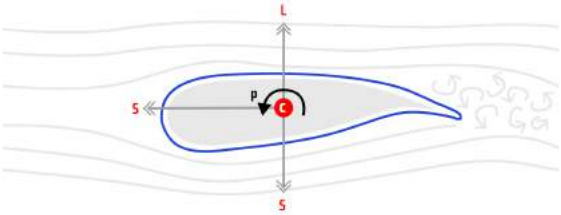


Fig. 6b: *CoP with released trims and brakes*

Closed trims

In this configuration brakes are the normal and prescribed steering system. Slow trim is used for launching in nil wind and thermalling. The canopy behaves similar to classic paragliders with slightly increased tuck resistance.

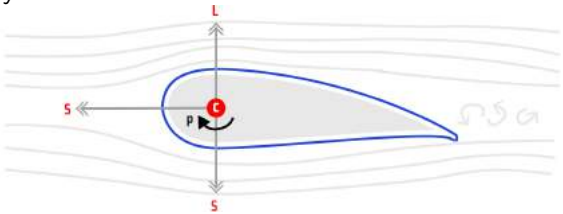


Fig. 6c: *CoP with closed trims*

Losing altitude

Extremely strong and widespread lift is found, for example, in storm conditions. The best place to be in this situation is on the ground. Nevertheless, if you have been caught out by the weather and find yourself needing to descend rapidly, there are several ways to do so. The best way is, of course, to find sink. Failing that, try one of the techniques below. Most of these techniques place undue stress on your glider, and should be avoided if you want to extend its lifetime. We recommend you initially practice these manoeuvres under qualified supervision during a safety training course.

Big ears

Big ears is the simplest method for rapid descent and has a sink rate of 3-5m/s. The advantage of big ears is that the glider continues to fly straight, meaning that a danger area can be avoided. It is even possible to land using big ears, for example on a top-landing to compensate for the updraft.

The wing-loading increases by the reduction in the wing's surface area, the wing becomes more stable against collapses in turbulence. Nevertheless, the air resistance of the wing also increases, and it flies more slowly and closer to the stall limit. To counter this and to increase the effectiveness of the sink, the speed bar is generally also used in combination with big ears.

Start the manoeuvre by pulling both outer A-lines downwards. The brake lines are held steady and the pilot uses weight-shifting to steer the paraglider. You can now descend safely on the stable middle part of the wing. The brakes must not be shortened during the manoeuvre, e.g. by wrapping the brake lines.

For recovery let go of both A-risers smoothly. Assist the opening process by pumping the brakes if the ears do not open automatically.

B-Stall

The design of the Falcon means that the B-Stall is not possible.

WARNING

Never use big ears with strong motor thrust. The resistance of the glider canopy increases the angle of attack and the glider may go into a deep stall. The technique of big ears causes a higher load for the line groups which are still weight-bearing. Therefore, do not fly any extreme manoeuvres with big ears.

This manoeuvre should be avoided in low temperatures. Pilots should be aware that this increases the tendency to deep stall.

Spiral dive

The spiral dive is an extreme manoeuvre. Practice spiralling with caution and lower sink rates to get a feeling for the Falcon's behaviour. Weight shift and pull the brake on one side gradually. Let it accelerate for two turns and you will enter the spiral dive. Once in the spiral, you can control your descent rate and bank angle with weight shift and the outer brake. Spiral dives induce large G forces, and these can disorient the pilot and stretch the glider lines and sail.

The outer wing tip may collapse during the spiral dive although this is no cause for concern. It can be avoided by lightly braking on the outside. Release the brakes carefully.

o allow the glider to exit from a spiral dive, your position in the harness must either be neutral, or even better, on the opposite site of the turn while spiralling. If you release the inner brake the wing will normally exit the spiral dive by itself. The Falcon has no tendency to stay in a stable spiral, but nevertheless, you should know how to exit from a stable spiral: weightshift actively to the outside of the turn and pull the outer brake until you feel the deceleration of the wing and your body moving towards a more upright position. Then, release the outer brake and let the glider decelerate for one or two more turns. Apply a short brake action on the inside brake just before the glider exits the spiral dive completely. This will burn off the remaining energy and avoid a big pendulum moment after exiting the spiral.

We advise you to limit the sink rate of the spiral to a maximum of 14 m/s and always maintain ground clearance of 150 – 200m. It is possible to reach a much higher sink rate but the following risks of increases with higher sink rates:

- *cause a loss of consciousness*
- *lose control over the flight manoeuvre and sink rate, the glider will go into a stable spiral. If this happens, immediately deploy your reserve!*
- *stress loading and/or loss of consciousness can occur during the spiral which make subsequent recovery impossible*

WARNING

In the spiral dive, very high turn speeds can be reached with an increase in acceleration due to gravity (up to over 6g), so exercise care when attempting this manoeuvre.

A pilot who is dehydrated and/or not accustomed to spiralling can lose consciousness in a steep spiral dive! As with all types of aircraft, we advise you to assist the glider to exit from the spiral dive in a controlled manner.

Spiral dives with "big ears" lead to extreme loading of the open section of the canopy. Therefore this manouver is prohibited!

Landing

The Falcon has good handling and completely normal landing characteristics, so no special techniques are required. Select a familiar landing area free of obstacles and carefully note the wind speed and direction in the landing area. The minimum flying speed and big flaring reserve of the Falcon will help you to make a soft landing in all conditions. Approach the landing with sufficient airspeed and don't leave your last turn too late or too steep.

Do not pump the brakes to degrade the glide angle, you risk entering a deep stall. Always fly with sufficient speed when you are near the ground (well above stall speed) to avoid an unintentional stall.

Bear in mind the following points whenever you are landing, both with the motor running and without the motor running:

- *Before you launch, have a good look at the landing area / airfield.*
- *Before landing, check the wind direction and speed.*
- *Practise landing approaches as often as possible so that you become familiar with the Falcon.*
- *Less space is needed to land without the motor running.*
- *The brakes should be applied in a more regulated manner if there is a strong headwind. After you have landed, turn to face the glider if there is a risk of.*
- *Being pulled back by the glider and falling over.*
- *Avoid landing out of a steep turn or making a rapid change of direction before landing because of the pendulum effect caused.*

Landing with stationary propeller

Landing with stationery propeller reduces the risk of damaging the propeller and lines during landing. However, you then do not have the option of making a "touch-and-go" if the landing approach is bad or correcting the approach.

For a landing with stationary propeller, switch off the motor 30-50m above the ground. The

Falcon's angle of attack reduces because there is no thrust from the motor, and the glider picks up speed noticeably. The sink rate also increases so that the landing approach initially begins very quickly and with increased sink. In the lower brake range, the Falcon then begins to convert the energy and flares noticeably. Landing with the Falcon therefore has much higher dynamics than with a conventional paraglider.

Landing with motor running

Prepare for a landing with the motor running by making a straight final approach into the wind and allow the Falcon to level out with the motor running. One meter above the ground, pull down the brakes as far as they will go, so that the glider is fully braked shortly before touching the ground. Switch off the motor immediately after touching down.

Further tips on paramotoring

Please observe the following points when flying the Falcon:

- *Never start the motor downwind from the glider.*
- *Check the seals on all fuel lines.*
- *Check whether you have enough fuel for the flight you have planned.*
- *Check your equipment for any loose parts which could get caught in the propeller.*
- *Go carefully through each of the points in the pre-flight check before every flight.*
- *Turn off the motor as soon as you have landed, to avoid line and propeller damage.*
- *Avoid flying over water and electricity lines, never fly between trees and in general avoid areas which have no landing options if the motor fails.*
- *If the noise of the motor changes or if there is increased vibration, you should land immediately and attend to the problem.*
- *Bear in mind that the noise of a motor can be irritating, and avoid making flights low over residential areas.*

Types of use

The Falcon was developed and tested for use solely as a paramotor wing. Any use other than as intended is prohibited.

Free flying

The Falcon was not developed or tested for free flying.

Towing

The Falcon was not developed or tested for towing.

Aerobatics

The Falcon is not designed for aerobatics and in many countries acro flying is forbidden. Besides the inherent risks, extreme manoeuvres of any kind place unnecessary stress on the glider and effectively shorten its lifespan. We strongly recommend no acro flying or unnecessary manoeuvres to avoid a risk of unpredictable flight attitudes, which could lead to damage to material and structural failure.

4. Dangerous situations and extreme flying

Dangerous situations

Pilot error, extreme wind conditions or turbulence which goes unnoticed by the pilot for too long may leave the wing in an unusual flying position, requiring special reaction and skills on the part of the pilot. Any pilot who flies in turbulent conditions or who makes an error in handling the glider is at risk of getting into an extreme situation. All of the extreme flight figures and flight attitudes described here are dangerous if they are carried out with inadequate knowledge, without the right safety altitude or without training.

In turbulent conditions, always keep enough distance from rock faces and other obstacles. Time and sufficient altitude are needed to recover from extreme situations.

Always keep within the recommended limits. Avoid aerobatics and extreme loading such as spirals and big ears. This will prevent accidents and avoid over-loading the glider.

Deploy your reserve if the corrective manoeuvres described in the following sections do not return the glider to a controllable flying position or if there is not enough altitude for correction.

Ground-training is a safe and effective method of familiarising yourself with your glider's reactions. Launch can be practised, as can small flying manoeuvres, such as stall, asymmetric collapse, front stall etc.

Safety training

Taking part in safety training is generally recommended so that you can familiarize yourself with your glider and the correct reactions in extreme situations. However, safety training also subjects your equipment to extreme loads.

WARNING

Extreme flight manoeuvres with a motor under full load are extremely dangerous and therefore cannot be tested. In this section we describe how to correct extreme situations in the event that one should ever occur. The manoeuvres below relate to the take-off weight without motor and should help to understand the behaviour of the glider.

The glider design is such that the following flight manoeuvres cannot be performed in terms of the certification test report:

- ***asymmetric collapse with open trimmers***
- ***asymmetric collapse with open trimmers and speed bar***
- ***front stall with open trimmers***
- ***front stall with open trimmers and speed bar***

Material stress and damage

Gin Gliders advises against subjecting the materials of the Falcon to excessive stress during a safety training course. Uncontrolled flight positions can occur during safety training, which are outside the manufacturer's limits for the paramotor glider and which can put the glider under excessive stress. Trimming the line lengths and canopy material after safety training can lead to a general deterioration in flight characteristics.

Canopy collapses

Collapses of the canopy can occur in strong turbulence. The Falcon will recover with pilot input through weightshift in almost all situations. Only if the wing surges very fast in front of you should you stop it with the brakes. However, it is recommended that you follow the advice below in order to help the wing recover more rapidly.

Asymmetric collapse

In the event of encountering strong turbulence and suffering an asymmetric collapse on one side, the Falcon will promptly and easily re-inflate without interference from the pilot, but the wing will turn slightly towards the collapsed side. This might be unwanted close to the ground or other gliders. Maintain your course by weight shifting away from the collapsed side. This action can be aided by applying a little gentle force on the B-riser or brake opposite to the deflation. This will normally be sufficient for recovery. However, it is sometimes necessary to pump out the deflated side with a firm and smooth pumping motion. Let the glider regain its flying speed after it has re-inflated. It is important not to apply too much brake input, as this increases the risk of deep stall.

If you have a big collapse - especially when flying accelerated - you must observe the following:

When a big collapse happens, due to the difference in weight and inertia of the canopy and pilot, the pilot will continue to travel forward and the canopy will fall behind the pilot, especially when flying accelerated. You must wait until you pendulum back below the canopy before reacting

IMPORTANT

Damage as a result of safety training is not covered by the warranty.

and carefully counter-braking the open side of the canopy. If you react too early, you risk stalling the collapsed canopy completely and this can lead to a cascade of further collapses.

When you have a big collapse in accelerated flight you must first release the speed bar immediately. Check your position relative to the ground, and if you have enough space stay neutral with your weight and brake to open side slightly to control the turn, but let the glider turn, to maintain airspeed. Watch the open side of the wing, and apply brake to control and limit the turn, but avoid applying so much brake that the open side of the wing starts to arc backwards as this indicates the flying side of the wing is on the edge of stall. Once the turn is stabilized weightshift heavily towards the open side of the wing so that you can limit the turn or maintain direction without having to apply excessive brake. In most cases the collapse will open on its own, but you may need to pump it out. This is the optimum action to avoid a spin or stall and help your glider to recover as fast as possible.

Cravat / glider wrapped around lines

A cravat occurs after a severe deflation when the wing tip becomes trapped in the glider lines. It can occur on the Falcon, usually after big deflations or in cascading situations. The pilot should be familiar with the procedure for correcting it. On the Falcon, there is a separate stabilizer /winglet main line that goes down to the A2 riser. This line usually becomes slack in the event of a cravat. Pull it down completely until it becomes tight and the cravat normally comes out.

Alternatively, on the side of the wing with the cravat, pull the brake fast and strong. Be careful not to let the wing enter a developed spin. If the tangle has not come free after several attempts, you still have the option to open it like a deep stall or a full stall. These flight manoeuvres always require adequate altitude and a high level of pilot skill.

Deploy your reserve if the corrective manoeuvres described in the following sections do not return the glider to a controllable flying position or if there is not enough altitude for correction.

Symmetric front collapse

A symmetric front collapse will normally reopen promptly by itself without any pilot input.

***Fig. 7:** Grabbing the stabilizer/winglet main line*

The glider will regain airspeed with a small surge. If counter braking, be careful not to over-correct or to brake too early, when the glider is still behind you - danger of a stall! If the glider does not re-open by itself, pull the brakes firmly for a second or two and then release promptly. This also prevents the wing tips moving forwards during the front stall. In the case of extreme front stalls across the entire wing chord, the wing tips may move forward. Stop the glider forming a U-shape by timely and energetic use of the brakes. There is a risk that the wingtips will become tangled if they touch each other.

Types of stall

When a paramotor glider flies through the air, a laminar and turbulent boundary layer is created. Extremely dangerous flight configurations can result if the laminar boundary layer is interrupted, with practically the entire airflow along the top surface braking away. This happens in particular when the angle of attack is too great.

There are three different types of stall in paragliding.

Deep stall (parachuting, stable stall)

The Falcon has no tendency to get into in a deep stall. Should this nevertheless occur, make sure your brakes are fully released, the glider will then normally recover on its own immediately. If the glider still doesn't recover either put your hands on the A risers and push forward or use the speed bar to accelerate the wing.

You can recognise a deep stall by the glider getting "mushy" and the airflow around your ears decreasing. The glider may also compress spanwise. Flying in strong turbulence or exiting a deflation with too much brake applied can cause this situation. A wet glider also has a higher deep stall tendency, and you should do everything you can to avoid flying in the rain. If you do pass through some rain apply speed bar until you are confident that the wing has dried out. An out-of-trim glider, caused by changes in line lengths due to prolonged use, may also have a higher deep stall tendency.

WARNING

Full stall and spin are manoeuvres which can be fatal if recovery is not correct. These manoeuvres should therefore be avoided. However, it is important to learn how to recognise the indications that a glider is about to stall so that you can take immediate action to prevent it.

Full stall (dynamic stall)

The full stall happens when the wing partially deflates and loses its arched shape. It is triggered when the maximum possible angle of attack is exceeded. The most common cause is going below the minimum speed or flying near the minimum speed combined with the effects of turbulence.

In full stall, the paramotor glider loses its forwards travel, surges backwards and deflates. If the brakes are held down, the canopy comes up over the pilot again. The result is an almost vertical descent with a sink rate of approx. 8m/s.

Slowly release the brakes, making sure that this is done symmetrically. As soon as the glider is completely open above the pilot, the brakes are released.

As this is done, the canopy accelerates forwards dynamically and picks up speed. Do not brake too soon (otherwise it could go into a full stall again), and be careful to avoid a front stall by making sure that it does not shoot too far forwards.

Spin

The spin is a stable flight attitude, in which one side of the canopy stalls, while the other side continues to fly forward. The glider turns around the stalled side of the wing.

In normal thermal flight, you are not very far from the limits of a spin. If a spin occurs, just let up the brakes and wait for the glider to surge forward, checking it with the brakes if it surges too far. Never release the spin if the glider is far back behind you, always try to release it when the glider is above or in front of you!

If the spin does not stop, check whether you have released the brakes fully!

Other tips for dangerous situations

Cascade

Many reserve deployments are a result of a cascade of over-corrections by the pilot. Please note that over-corrections are often worse than no input at all.

WARNING

If the canopy has gone back during the full stall, the brakes must be held down, otherwise the canopy may surge forward and, in an extreme case, end up underneath the pilot. Hold the brakes down until the canopy is above you again.

Emergency steering

If a brake is not operational for some reason, you can steer the Falcon with the D- risers. Add steering input by weight-shifting in your harness. Be careful not to pull the riser too much, to avoid any possibility of a spin.

Flying in the rain

We strongly advise you not to fly in the rain on any paramotor glider including the Falcon. If you do fly in the rain, be aware that you will have a greater risk of entering a deep stall. It is wise to apply speedbar after passing through rain until you are confident that the glider is flying normally, and has preferably dried out so that there is no longer any risk of deep stall.

Flying in extremely humid weather or in rain is outside of the operating limits of the glider. If you are not able to avoid flying in rain, please observe the following:

- *it is advisable to fly with slight acceleration during and after the rain (min. 30% or more)*
- *use no brake input or as little as possible*
- *control travel reduces*
- *avoid tight turns, especially in the final approach. If conditions allow, you should also fly slightly accelerated in this phase*
- *avoid large angles of attack and the possible early stall near the ground (release the speed bar only slowly*

Advertising and adhesives

Always make sure before attaching advertising to the glider that the adhesive planned will not alter the glider's flight behaviour. If you are in doubt, we recommend that you do not attach the adhesive.

Overloading

The glider structure is put under high levels of strain in particular on extreme flight manoeuvres, rapid descent methods (spiral dives) or prohibited aerobatic manoeuvres. They considerably accelerate the aging process of the structure and should therefore be avoided.

IMPORTANT

Attaching adhesives to the glider which are large, heavy, or made of unsuitable material may result in revocation of the certification.

The glider must be inspected earlier than is usually the case if it has been put under more than the usual degree of strain.

Sand and salt air

In many cases, sand and salt air cause the lines and fabric to age much more rapidly. If you often fly near the sea, the glider should be inspected more frequently than normally required.

Temperature range

Temperatures under -10 °C and over +50°C can make the paramotor glider unfit to fly. The manufacturer's warranty will lapse if the glider is used outside of this temperature range.

5. Storing, care, maintenance / repairs and guarantee

Storing the paramotor glider

Packing the paramotor glider

It is very important to pack the glider carefully in order to ensure the longevity of the leading edge reinforcements. Fold up the Falcon as shown in the diagrams below. The leading edge reinforcements (Mylar and Rigid-System) on the front edge are placed on top of each other to avoid bending or misshaping them. This method of packing ensures that the leading edge is treated carefully, which will increase the glider's life, performance and launch behaviour.

If the reinforcements have been bent or misshapen, they distort more easily during flight and this may create an altered air inflow. This can lead to a loss in performance and changes in flight behaviour. The leading edge reinforcements also perform an important function on launch. Therefore, the less they have been bent, the more easily the glider will inflate and launch.

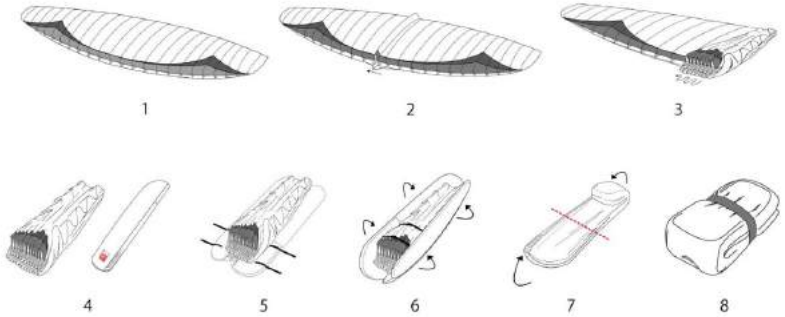


Fig. 8: *Packing the Falcon*

IMPORTANT

Do not drag the paraglider across any rough surfaces such as gravel or asphalt. This may damage the seams and surface coating.

1. *Spread out the paramotor glider completely on a smooth surface. Do not drag the paramotor glider across any rough surfaces such as gravel or asphalt. This may damage the seams and surface coating.*
2.-3. *All the ribs on one side are placed one on top of one another, so that the leading edges are not bent.*
4. *Then continue as in the second step, placing the leading edges of the other side on top of the next until you reach the tip of the glider. Place the concertina bag underneath the glider which has been folded together, so that the ribs are all lying along the length of the concertina bag.*
5. *The glider is now folded up along its length, and the leading edges are on top of each other without having being bent.*
   Fasten the straps near the leading edges, so that they do not slip, and the straps in the middle and at the end of the glider.
6. *Do up the zip, making sure that none of the lines or fabric is caught in the zip.*
7. *Fold up the glider along its length, with the first fold below the leading edge reinforcements. Pay particular care not to bend any of the rigid reinforcements!*
8. *Fold the glider again. Then place the compression strap around the glider and fasten it by pulling gently. Make sure that the glider is only loosely folded and is not bent or compressed excessively.*

Rucksack

All GIN gliders are delivered with a durable ripstop Codura® rucksack with 160L capacity. The rucksack should be packed carefully to achieve maximum comfort. First, place the glider inside the harness and then put the top of harness in the bottom of the rucksack with the glider side next to the back of the rucksack. Finally, tighten the internal and external compression straps and adjust the shoulder and waist straps to ensure the equipment stays firmly in place when walking. There are also two storage pockets for accessories.

An XXL rucksack is available as an optional extra for pilots that require it.

TIP

Make sure that the leading edge reinforcements lie flat and are not bent or twisted by doing up the Velcro too tightly.

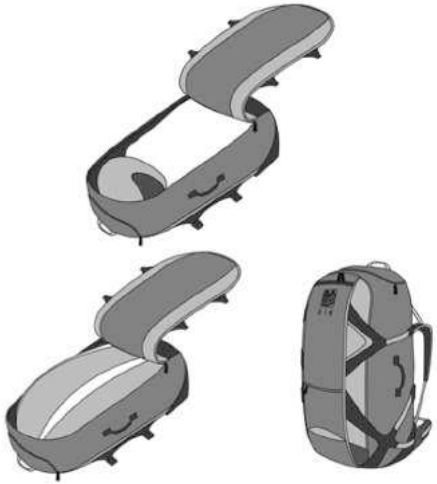


Fig. 9: *Packing the rucksack*

Storing and transporting the glider

Even if your paramotor glider was completely dry when it was packed up after the final flight of the season, for long-term storage you should if possible take it out of the backpack and spread out the canopy a little in a clean, dry place away from direct light. If you do not have the space to do this, then open the backpack, internal bag and belt as much as possible and avoid compressing it. It must be stored at a temperature between 10° and 25° C and in relative humidity between 50 and 75%. Make sure too that the paramotor glider is not stored in a place where animals such as mice or cats could use it as a place to sleep.

Do not store the paramotor glider near any chemicals. Petrol, for example, causes the material to disintegrate and can cause considerable damage to your paramotor glider. When your equipment is in the car boot, keep it as far away as possible from any spare petrol cans or oil containers.

The Falcon should not be exposed to extreme heat (e.g. in the boot of the car during summer). The heat may cause any moisture present to be pressed through the fabric, thereby damaging the coating. High temperatures accelerate the process of hydrolysis, particularly when combined with moisture, which damages fibres and coating. Do not store your paramotor glider near radiators or other heat sources. Always transport your glider in the special concertina bag and use the backpack provided for the rest of the equipment.

Care

The materials used in the Falcon have been carefully selected for maximum durability and performance. Nevertheless, following the guidelines below will keep your paramotor glider airworthy and will ensure a long period of continuous safe operation. Excessive wear is caused by careless ground handling and packing, unnecessary exposure to UV light, chemicals, heat and moisture.

Ground handling

The following should be avoided:

- *Violent shocks to the upper surface (e.g. when the canopy crashes to the ground leading edge first whilst ground handling).*
- *Dragging the glider along the ground.*
- *Stepping on the lines or canopy. The Kevlar line inside the sheath can take lots of pulling force without stretching, but is sensitive to bending with small radius.*
- *Opening your wing in strong winds without first untangling the lines.*

Fabric

Care is essential to ensure that the fabric and glider remain durable and retain their qualities. The glider should therefore be protected from unnecessary UV light. Do not unpack your glider until immediately before flight and pack it up straight after landing. Modern paramotor glider fabrics have better protection against the sun, but UV rays in particular are still one of the decisive factors in how the fabric ages. The colours will fade first and then the coating and fibres will begin to age.

When choosing a place to launch, try to find somewhere which is smooth and free of stones and sharp objects. Do not stand on the glider. This weakens the fabric, especially if it is on a hard or stony surface. Pay attention to the behaviour of spectators at the launch site, especially children: do not hesitate to draw their attention to the sensitive nature of the fabric.

When you are packing up your glider, make sure that there are no insects trapped inside. Many insects produce acids when they decompose, which can cause holes in the fabric. Grasshoppers make holes by biting through the fabric and also excrete a dark liquid which stains. Keep animals away when you are packing up. Insects are not attracted by any particular colours, contrary to what is commonly believed.

If the glider gets wet or damp, it should be dried as soon as possible in a well-ventilated room (but out of the sun). It may take several days before the canopy has dried completely because the

fibres absorb water. Mould may form if the paramotor glider is stored wet and the fibres may rot, particularly when it is warm. This can make the paramotor glider unsuitable for flying within a short time.

A brand-new glider will often be compressed when delivered. This is solely for the initial delivery and the glider should not be compressed in such a way again. Do not pack your glider too tightly after use and, even though it is very comfortable, never sit on the backpack with the glider inside.

If salt water gets on the glider, it should be rinsed immediately in fresh water (refer to the section "Cleaning").

Lines

The Falcon has various different high-quality and accurately manufactured lines which have been selected according to the load and area of use. You should also protect the lines from unnecessary UV light because, as with the fabric, UV light in particular will weaken the lines.

Be careful that there is no abrasion caused to the coating on the lines by rubbing, particularly when ground-training with crossed risers.

Do not walk on the lines after the glider has been spread out and watch out for spectators or skiers who may inadvertently go over the lines.

When you are packing up the glider, be careful to avoid putting any unnecessary kinks in the lines and use only the overhand knot or bowline knots described for the brake lines.

Rigid construction

Various forms of plastic rods are used in the Falcon (rigid construction), which create the leading edge's shape and the canopy's stability. To ensure that the plastic rods keep their shape, it is important that you pack the glider as described in the section "Packing the paramotor glider".

The plastic rods on the Falcon can all be replaced through small pockets. If you notice that a plastic rod has been damaged or misshapen because of incorrect use, this can be replaced by Gin Gliders or a Gin Gliders authorised workshop.

IMPORTANT

Dyneema lines, which are used in the area of the main brake lines, for example, are very temperaturesensitive and can be permanently damaged at temperatures above 75° C.
Therefore your glider should never be stored in a hot car especially during summer.

Cleaning

If you do have to clean the glider, use only lukewarm fresh water and a soft sponge. Use a weak soap solution for stubborn stains, and then rinse it out carefully and thoroughly. Leave the glider to dry in a place which is well-ventilated and in the shade.

Do not under any circumstances use chemicals, brushes, rough cloths, high-pressure cleaners or steamers to clean the glider, as these can damage the fabric coating and weaken it. The glider becomes porous and loses braking strength.

Do not under any circumstances put the glider in the washing machine. Even if washing powder is not used, the glider would be badly damaged by the mechanical action of the machine. Do not put the canopy into a swimming pool - chlorine will damage the fabric. If you have no choice but to rinse the glider, e.g. following a landing in the sea, gently wash it down inside and out with fresh water. Frequent rinsing accelerates the aging process.

Maintenance

Type designation

GIN gliders have an exact identification on the underside of the wingtip or on the centre rib, which is obligatory for all paramotor gliders. The information required is set out in the airworthiness requirements.

It is helpful to provide the type designation of the paramotor glider if you are contacting your Gin Gliders dealer with any queries or ordering replacement parts or accessories, to ensure accurate identification.

Inspection periods

Failure to observe the inspection periods shall render invalid the certification and warranty. A properly completed logbook with details of all flying and training will help you to comply with these periods.

A qualified professional should perform a formal maintenance inspection no later than 36 months after the first flight or after 150 hours, whichever is sooner. Subsequent inspections

should be carried out every 24 months or 150 hours, whichever is sooner. Inspection should consist of measurements of the fabric porosity, tear resistance, line strengths, line lengths and a full visual check. The full protocol is available on our website.

If you groundhandle frequently or fly in harsh conditions, we recommend an annual check. It's your responsibility as a pilot to ensure that your wing is airworthy at all times.

A full inspection will give you peace of mind and extend your glider's lifetime. Additional inspections should be performed by a qualified person following a crash or violent landing on the leading edge, or if you note a deterioration of performance or behaviour. You should also check for any damage to your lines, sail, risers and connectors before each flight.

Validity of inspection

It is very important that your glider is serviced at the required intervals throughout its entire life. In order to benefit from Gin Gliders warranty:

- *you must have your paramotor glider inspected by Gin Gliders or an inspection agent authorised by Gin Gliders*
- *the documentation and the result of the inspection must be clearly identifiable (date, place, name of the inspector) and be entered near the glider information/certification sticker*

Material stress

Uncontrolled flight positions—such as may be encountered during safety training, extreme manoeuvres or after massive collapses or cascades—are outside the manufacturer limits of the paramotor glider. This may cause a general deterioration in flight characteristics, premature ageing, or even structural failure.

Repairs

Gin Gliders workshops

All repairs and servicing should be carried out by a Gin Gliders authorised workshop or directly by Gin Gliders. Gin Gliders workshops have trained staff, original Gin Gliders parts and the necessary know-how, all of which will ensure top quality.

Major repairs at the Falcon, such as replacing panels, should only be carried out by the distributor or manufacturer.

Small repairs to the glider

Very small holes in the sail can be repaired with the sticky back tape provided with your glider. Damaged lines should be replaced by your GIN dealer. Before fitting a replacement line, check it for length against its counterpart on the other side of the wing. When a line has been replaced, always inflate the glider on flat ground to check that everything is in order before flying.

Gin Gliders lifetime guarantee

Gin Gliders are proud to guarantee the quality, craftsmanship and performance of all our products. Equipment with defects in materials or manufacturing will be repaired or replaced at the discretion of Gin Gliders for the practical lifetime of the product. Equipment damaged through wear and tear, misuse or neglect may be repaired at a nominal charge.

If you have any problems with your equipment, please contact your GIN dealer in the first instance, or Gin Gliders directly via our website.

Register your Falcon

Register your Falcon to receive safety updates, and improved guarantee and repair service.
http://gingliders.com/register

6. Dimensions, illustrations, technical and DAGC data

Description

The Falcon is a state-of-the-art reflex paramotor wing for intermediate to advanced pilots. The wing is fast, stable, agile and fuel-efficient—ideal for fun flying, cross-country, bivouac and competition.

Fast and fuel-efficient: The Falcon has a wide speed range, and transitions easily from flat, efficient turns in thermals to relaxed, high-speed cruising. The wing is equipped with a competition speed system which acts on both the accelerator and the trimmer. Pushing the speedbar also simultaneously releases the trimmers and vice versa.

The Falcon also achieves excellent fuel-efficiency thanks to the aerodynamic efficiency of the state-of-the-art airfoil.

Stable and safe: The Falcon inflates easily and quickly produces lift in a co-ordinated manner, allowing stress-free launches in the widest range of wind speeds. The wing has a high degree of passive safety both in turbulent air and at speed. However, pilots with more limited experience must always remain aware at high speeds.

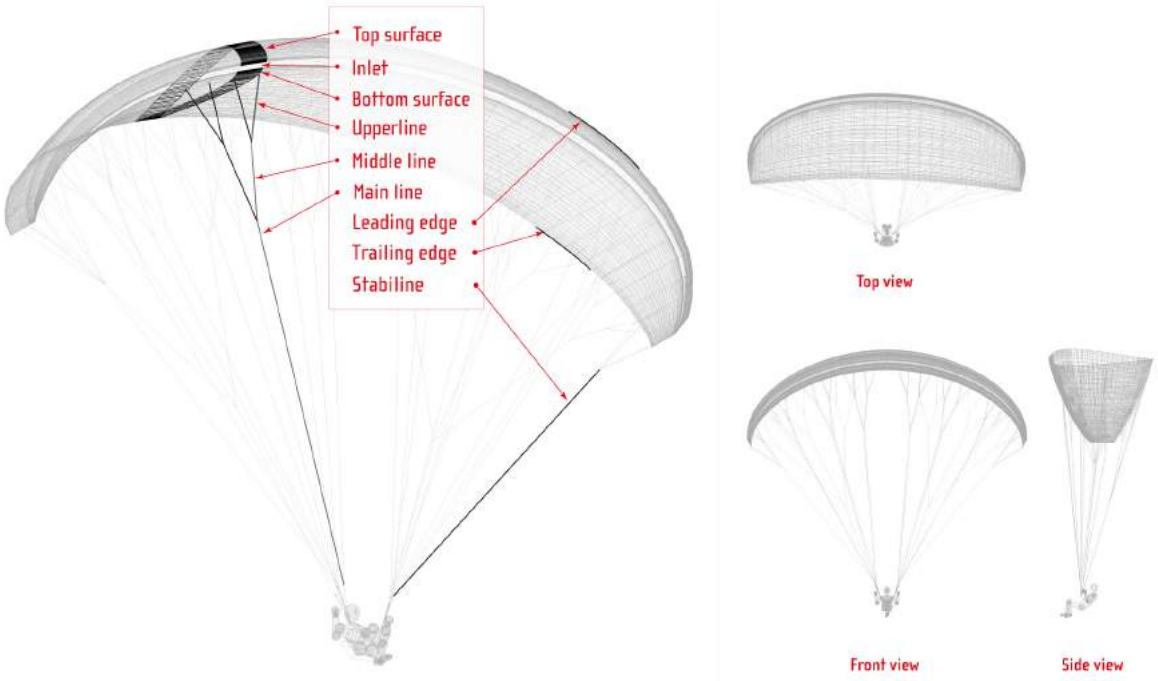
Agile and fun: Handling was a key consideration in the design and development of the Falcon. Hours of testing, tuning and trimming have resulted in an agile and precise wing. The standard steering system makes control easy and efficient, and the wing can be tip-steered at speed. Alternatively, an optional 2D steering system is available.

Overall, the Falcon is simply an all-round pleasure to fly. Whether you're drifting leisurely across the landscape or eating up the miles in a distance competition, it's a wing we believe you'll come to love.

Manufacturing

All GIN gliders are produced in the company's own facilities using the most modern techniques. Highly skilled staff take extreme care during the entire manufacturing process. Stringent quality control is made after each step, and all materials that go into each wing can be traced. These measures guarantee that pilots fly with the assurance that their wing meets the most exacting safety standards.

Overall illustration



Technical data

Size	*20*	*22*	*24*	*26*	*28**

Flat Area [m²]	20.36	22.27	24.16	26.03	27.97
Flat Wingspan [m]	10.60	11.09	11.55	11.99	12.43
Flat AR	5.5	5.5	5.5	5.5	5.5
Projected Area [m²]	17.60	19.25	20.88	22.50	24.18
Projected Wingspan [m]	8.63	9.03	9.40	9.76	10.11
Projected AR	4.2	4.2	4.2	4.2	4.2
Number of cells	56	56	56	56	56
Glider weight [kg]					
Take off weight Paramotor[kg]	75-120	85-130	95-140	105-155	115-170
CERTIFICATION (EN)	*926-1*	*926-1*	*926-1*	*926-1*	*926-1A*
Certification (PARAMOTOR)	*DGAC*	*DGAC*	*DGAC*	*DGAC*	*DGAC*

Riser

The risers were developed specifically for the Falcon. A new type of trimmer system ensures a great increase in speed by effectively altering the angle of attack across all riser levels. In addition, a wing tip brake and torque compensator give the option of steering the glider independently and adjusting it to the motor output. This ensures maximum flexibility in adapting it to the particular drive system and takes into consideration the specific requirements of paramotor pilots.

The Falcon's risers, at 480 mm, are shorter than those of conventional gliders. This allows better adjustment of different attachment point positions of the motor unit/harness. The brake pulley can be moved so that it can be adjusted to the ideal position. The brake handles are attached to the riser by strong Neodym magnets. The advantage of the magnets is that the brake handles can simply be attached to the risers during flight.

The individual parts of the Falcon risers at a glance:

- *Torque compensator system*
- *Wing tip brake system*
- *Power Attack (PA) system*
- *Kick down system with stop ball*
- *upper brake line pulley*
- *main brake magnetic mount*
- *lower brake line pulley*
- *interchangeable trimmer strap*

The section "Flying the Falcon" has further information on using the acceleration system, the wing tip brake and the torque compensator.

Fig. 10: *Falcon riser*

Trimmer

The trimmer allows the pilot to increase the cruising speed in motorised flight and to counter the torque effect. We recommend that you always have the trimmers closed when launching or landing.

Do not brake the glider symmetrically in accelerated flight. Pulling both brakes down firmly can deform the profile and, in an extreme case, cause a frontal collapse.

Fig. 11: *Overview picture of the riser with the trimmer*

Speed System

The speed system increases the maximum speed by lowering the angle of attack with a pulley-guided, foot-operated system. It is important to have your accelerator system correctly routed through your harness and attached to the risers with the supplied Brummel hooks. The length of the speed bar should be initially adjusted while on the ground, sitting in the harness so that the legs are fully extended at the point of full accelerator travel. It is helpful to have an assistant hold the risers taut while making this adjustment.

After the speed bar has been adjusted according to the length of the pilot's legs or the harness, then the two-stage speed system is adjusted. This system has two ball-bearing pulleys which reduce the acceleration pressure, thereby allowing comfortable acceleration even when the pilot's legs are bent. A stop ball then blocks the lower pulley, reducing the acceleration distance, and effectively converting every centimetre into speed.

The two-stage speed system can be adjusted using a stop ball, which is attached to the speed system cord by a simple knot. The speed bar distance is increased if the stop ball is pushed upwards. If it is pushed down, then the lower pulley is locked earlier, which reduces the speed bar distance and increases the pressure. This allows pilots to alter the speed bar according to their own preferences, and to adjust the speed bar extension range and pressure ergonomically according to leglength, the harness and the speed bar used.

Before launch, fasten the speed bar to the harness to avoid tripping over it when preparing to launch or when taking off.

Adjusting the speed system and trimmers

Use of a reflex profile means that the Falcon has special features that must be taken into consideration when using the speed system and the trimmers. The Falcon has a high basic trim speed even with neutral trimmer position, and this can be increased considerably by using the additional speed system and the trimmers. This gives the pilot a wide speed range, with which to make the ideal adjustment to cruise speed.

Fig. 12: *Stop ball at Falcon riser*

WARNING

Do not make the speed system too short. The glider must under no circumstances be pre-accelerated as a result of the adjustment being too short.
Problems (such as collapses or tucks) have a more drastic effect with increased speed than in unaccelerated flight. It is strongly recommended that you do not use the speed system in turbulent areas and when flying close to the ground, due to the increased risk of collapse.

Correct use of the speed system and trimmers is very important with reflex profiles. Therefore, study closely the comments with Figs. 13a – 13d, which show the various settings and positions.

Closed trimmers (Fig. 13a)

Because of the Falcon's high trim speed, we recommend selecting the setting with closed trimmers for launch and landing (the D-riser is shortened by 30 mm).

This setting is also suitable for flying in thermals because of the reduced sink rate.

Neutral trimmers (Fig. 13b)

In the neutral position (all risers

WARNING

When the trimmers are closed, use of the speed bar is forbidden. This configuration produces an extremely unstable profile and there is the risk of front stall or other extreme flight manoeuvres.

the same length) the reflex-profile is formed. This setting offers dynamic handling, a high level of stability and a good cruise speed.

Open trimmers (Fig. 13c)

When the trimmers are fully open (the D-riser is lengthened by 100 mm) the reflex

profile forms completely. Brake pressure is noticeably heavier, while speed, performance and stability are very high.

Open trimmers and use of the speed bar (Fig. 13d)

When the trimmers are fully open and the speed bar is used (the D-riser is lengthened by 90 mm and the A-riser is shortened by 175 mm by the speed bar) the profile is fully reflexed.

Torque compensator

On both sides of the Falcon risers on the upper part of the B-riser, there is a catch, through which an additional line passes. You are able to compensate for the torque using a simple prussic knot. Depending on the strength of the torque, the knot can be pushed upwards (if the torque is strong) or downwards (if the torque is weak). To activate the torque compensator, pull the knot through the catch and hook it into the slit in the catch.

Fig. 14: *Activating the Torque compensator*

Speed release system (SR)

The SR system merges the speed system with trimmer operation. It is intended only for competitors who fully understand the risks and benefits involved. Regular pilots will need up to three months before fully mastering its use.

The general concept is simple: pressing the speedbar simultaneously releases the trimmers (and vice versa, releasing the speedbar closes the trimmers).

***Fig. 15:** SR System activated by attaching the Brummel hook at the backside of A-riser*

Line system, brakes and line plan

Line system

The Falcon has A, B, C and D line levels, which fork two or three times from the bottom (riser) to the top (canopy) and which are divided into "Main", "Lower-Middle", "Higher-Middle" und "Top" lines. The individual line levels are connected with one another using the "handshake knot" (special hoop technology).

With the brake lines, the individual levels are bundled at the end with the main brake line. This runs through the brake pulley attached to the riser and is knotted at the brake loop of the control handle. There is a mark on the main brake line which allows the control handle to be correctly positioned.

The main lines are all attached to Maillon quick links. They are fed through special elastic rings and attached to prevent the lines from slipping and to ensure that they sit in the correct position.

Brake line adjustment

Factory setting

Correctly installed brake lines should have a slightly slack in the brake lines when the glider is in fully accelerated flight. Normally this is about 10cm in trim flight. This is how far you must pull down the brakes before the trailing edge of the paraglider starts to move downwards and

WARNING

The Speed release system is only for very experienced and professional pilots! Incorrect use can be extremely dangerous!

begins to brake. Note that the brake cascades already cause drag by their aerodynamic resistance.

If you do need to make adjustments to suit your harness / motor combination, body and flying style, we strongly recommend that you test fly the glider after every 2cm of adjustment. There should be a minimum of 10cm of free brake travel when the glider is flown hands-off. This prevents the brakes being applied unintentionally when the speed system is fully engaged. We recommend a double sheepshank or a bowline knot for the brake handle attachment as shown in the diagram.

Fig. 16: *Bowline knot*

Incorrect adjustment

If the brake lines are too long, the paramotor glider reacts slowly and is difficult to land. The brake lines can be adjusted during flight by wrapping them around your hands which will improve the flight characteristics. Adjust the brake lines to the correct length after you have landed.

If the brakes are shortened, care must be taken that the paramotor glider is not slowed down in trim and accelerated flight. If the brake lines are too short, the following risks could arise:

- *there could be an early stall*

WARNING

Loose, unsuitable or incorrectly tied brakeline knots can cause the main brake line to loosen and then lead to loss of control of the glider.

It is always safer to have the variable brake pulley adjustment too long rather than too short. Short brake lines can dramatically change the flight characteristics by removing stability both in pitch and roll!

It is always best to seek the advice and assistance of a local instructor or experienced pilot for any setting up requirements.

- *the paramotor glider does not launch well and there is a risk of deep stall*
- *the paramotor glider exhibits dangerous behaviour in extreme flying*
- *the trailing edge of the paramotor glider is braked in accelerated flight which, in an extreme case, could cause a frontal collapse*
- *other safety issues may arise and performance may deteriorate*

Environmental conditions can also cause the brake lines to shorten. Brake line length should therefore be checked regularly, mainly if there is any change in launch or flight characteristics.

Variable brake pulley

The height of the brake pulley can be adjusted to suit the needs of the pilot (see also the section "Riser" and "Trimmer"). If doing this, make sure that the brake line length is aligned to

the top position. If the brake line pulley is pushed down, the main brake lines should be lengthened by the same distance.

Higher hang points require longer brake lines, lower hang points, need shorter settings.

Fig. 17: *Variable brake pulley*

Wing tip brake adjustment

The wing tip brake is delivered ex factory adjusted to the main brake line setting. You should adjust the length of the wing tip brake by the same amount that you alter the length of the main brake line.

An elastic rope allows you to grip the wing tip brake easily together with the main brake handle. The rope is attached to the D-riser with a slider. This allows the length/position of the wing tip brake to be changed.

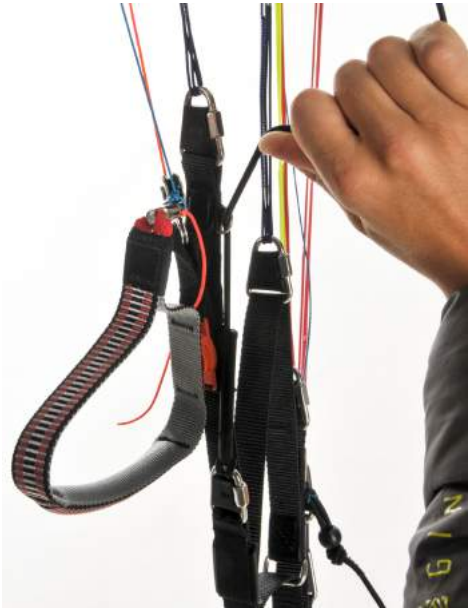
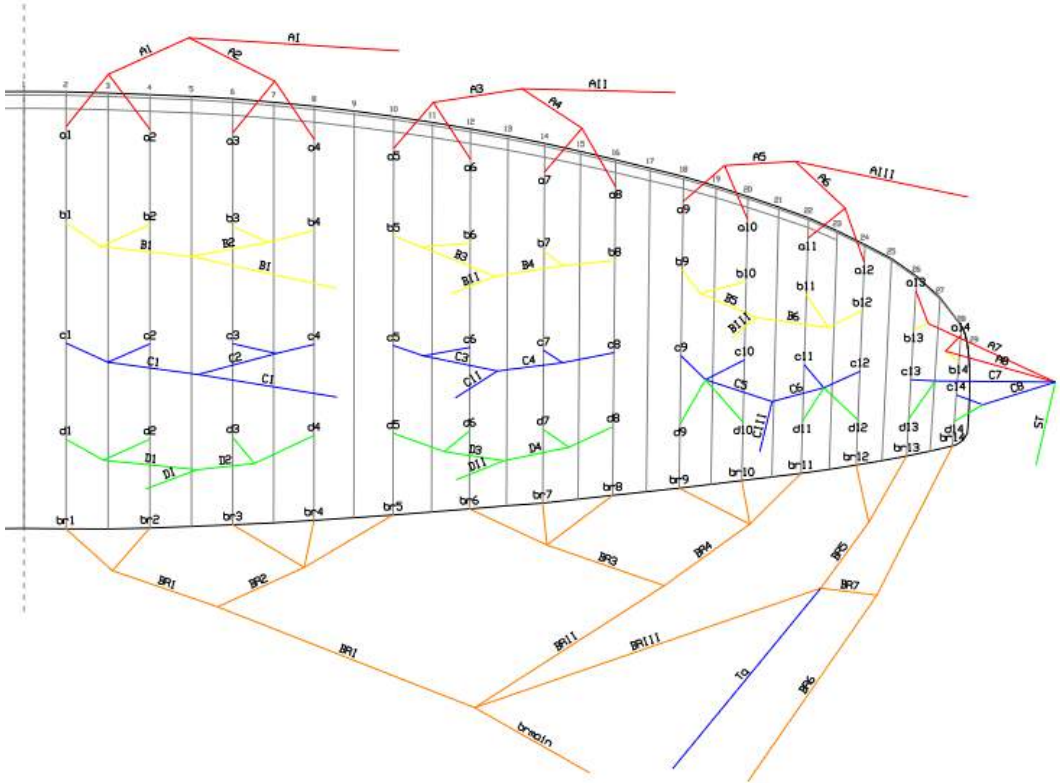
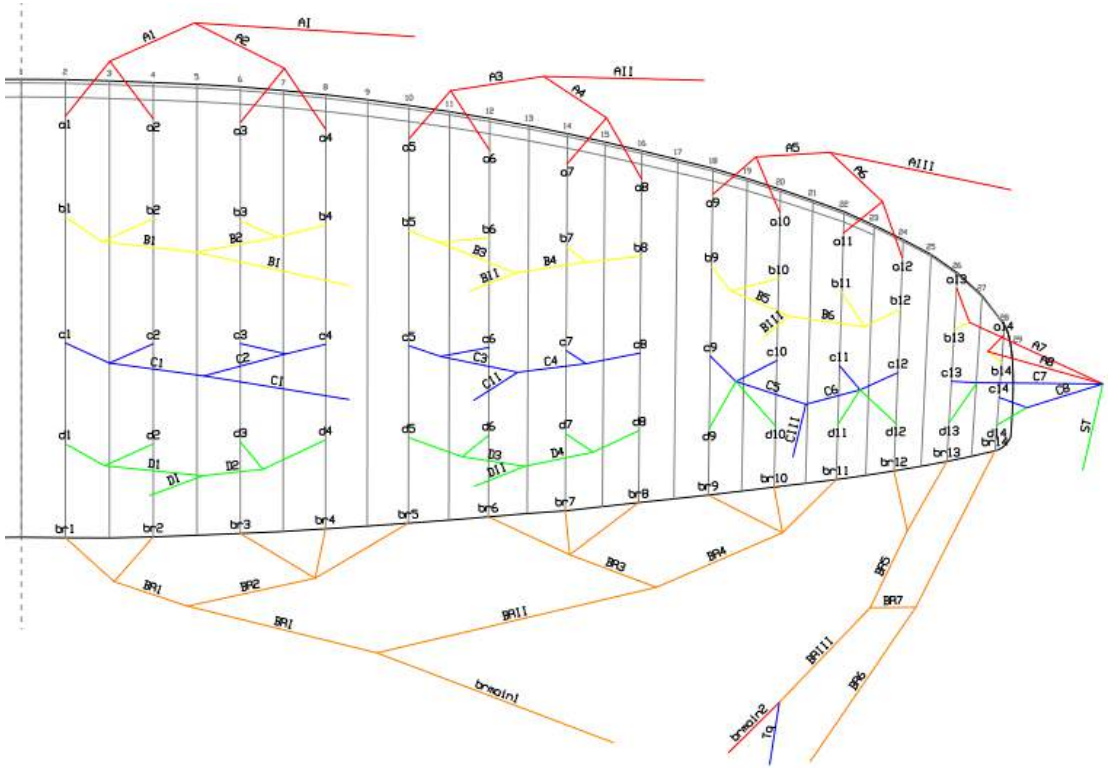


Fig. 18: *Wing tip brake with elastic rope and slider on D-riser*

Line plan (standard brake)



Line plan (2D steering)



Material list

Canopy fabric	
Upper surface	Dominico Dokdo 30D 42g/m^2 water repellent
Lower surface	*Dominico Dokdo 30D 42g/m^2 water repellent*
Ribs	*Dominico Dokdo N30 DFM 42g/m^2*

Lines	
Upper	*Liros DSL 70 Dyneema / GIN TGL 80 Aramid*
Middle	*Liros DSL 70, PPSL 120, 160 Dyneema*
Lower	*Liros PPSL 120,160,200 Dyneema / GIN TGL 280 Aramid*

Riser	
	Güth & Wolf M20030 20mm

Maillons	
	Stainless steel Ø 3.85m

Thread	
	Amann & Söhne - Mill Faden150D/3 Polyester bonded

DAGC Template

Size 20

in progress

Size 22

in progress

Size 24

in progress

Size 26

in progress

Appendix

Addresses

Gin Gliders Inc.
285-1 GalDam-Ri, Mohyun-Myun
Yongin City, Kyunggi-Do
449-851 Korea
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Fax:+49 (0) 8022 9675 – 99
Email: dhv@dhv.de
www.dhv.de

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Fax: +49 (0) 8334 - 534469
Email: info@para-academy.eu
www.para-academy.eu

Glider details

Size:	*Colour:*	*Serial number*
Check flight (date): _____		
Mark and signature: _____		

Pilot details / Proof of ownership

1. Owner	
Name:	
Address:	
Phone:	
Email:	
2. Propriétaire	
Name:	
Address:	
Phone:	
Email:	

Inspections and repairs overview

Date	Work carried out	General condition on delivery	Completed by (Name)	Stamp and signature

Notes

::: Gin Gliders Inc. :::
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GIN

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