

# *Fuse mini*

## User manual

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GIN

## **WARNING: Read this user manual before your first flight!**

**Like any extreme sport, paragliding involves unpredictable risks which may lead to injury or death. By choosing to fly, you assume the sole responsibility for those risks.**

**The safety advice and instructions contained in this manual must be followed in all circumstances. Failure to do so may invalidate the certification and/or result in loss of insurance cover.**

**Because it is impossible to anticipate every situation or condition that can occur while paragliding, this manual makes no representation about the safe use of the wing under all conditions. Neither Gin Gliders nor the seller of GIN equipment can guarantee, or be held responsible for, the safety of yourself or anyone else.**

Gin Gliders reserves the right to alter or add to the contents of this manual at any time. You should therefore regularly visit our website:

**[www.gingliders.com](http://www.gingliders.com)**

where you will find additional information relating to your paraglider and any changes to the manual. The date and version number of this manual are given on the front page.

## Thank you ...

... for choosing Gin Gliders. This user manual contains important information for the use and maintenance of your paraglider. Detailed knowledge of your glider and equipment will help you to fly safely and make the most of your flights.

The manual complies with the EN airworthiness and forms part of the certification. There are no special flying procedures and / or configurations apart from those detailed in this manual.

Your GIN paraglider has been designed to meet all safety and regulatory requirements. These requirements also include the need to familiarise yourself with this user manual and the information and instructions regarding safety, equipment and service prior to the initial commissioning. These operating instructions must be fully read and understood before the first flight.

If you have any further questions about these operating instructions, please contact your GIN dealer in the first instance, or Gin Gliders directly.

We wish you exciting flights and always a safe landing.

Your GIN team

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# Gin Gliders

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 aerodynamicists, world cup pilots, engineers and paragliding school instructors, all with one goal: creating better paragliders.

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 the 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. Our facilities are independently certified to AS9100C (Aerospace standard) and also to ISO 9001:2008.

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!

## Gin Gliders website

Gin Gliders has a comprehensive website, which provides additional information about the Fuse mini, any updates to the manual and many other issues related to paragliding.

**[www.gingliders.com](http://www.gingliders.com)**

On the Gin Gliders website, you will find an extensive range of accessories for your paraglider and other useful products.

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

- Gin Gliders Shops
- Facebook, Instagram, Twitter and 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 practicing 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. Consideration for nature is required even at the launch site!

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

### **Environmentally-friendly recycling**

Gin Gliders gives consideration to the entire lifecycle of its paragliders, the last stage of which is recycling in an environmentally-friendly manner. The synthetic materials used in a paraglider must be disposed of properly. If you are not able to arrange appropriate disposal, Gin Gliders will be happy to recycle the paraglider for you. Send the glider with a short note to this effect to the address given in the appendix.



# Safety

## Safety advice

Paragliding demands 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. Paragliders are not designed to be flown in turbulent weather. Most serious accidents with paragliders are caused by pilots misjudging the weather for flying.

Paragliders are subject to specific guidelines for air sports equipment in each country. They must not under any circumstances be flown without a valid certification. It's your responsibility to know and observe the regulations of the region where you fly. Independent experimentation is strictly prohibited. This manual does not replace the need to attend training at a paragliding school.

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

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 paraglider 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 which are issued in respect of GIN products. The paraglider owner is responsible for carrying out the action required by the safety notice.

## Liability, warranty exclusion and operating limitations

Use of the paraglider 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 Gliders paragliders.

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 paraglider is airworthy and must observe the relevant regulations in each country.

### **Liability and warranty exclusion**

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

- changes of any kind (incl. paraglider design or changes to the brake lines beyond the permissible tolerance levels)
- incorrect repairs to the glider
- 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 for winch-launching with a winch which has not been inspected or by non-licensed pilots and/or winch operators
- the pilot has insufficient experience or training

### Operating limitations

The paraglider 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 above 50°C and extremely low temperatures, which can lead, in combination with moisture, to icing
- aerobatics
- modifications to the canopy, lines or risers which have not been approved

## Before the first flight

### Harnesses

The Fuse mini is certified for use with all harnesses with variable cross-bracing (GH type). Practically all modern harnesses are GH type harnesses. Older harnesses with fixed cross-bracing (GX type) are not certified and should not be used. Check with the manufacturer of the harness or your paragliding instructor if in doubt whether your harness is a GH or GX type harness.

It's important for your comfort and safety to fly with a suitable harness that is properly adjusted. When choosing a harness, remember that the height of the attachment points (i.e. distance from the carabiners to the seat plate) affects the sensitivity of the glider and the relative brake travel. The lower (shorter) the attachment points, the more sensitive the glider is to weight-shift.

The adjustment of the harness chest strap controls the distance between carabiners and affects the handling and stability of the glider. Excessive tightening of the chest strap increases stability but also the risk of riser twists following glider collapses. It also increases the likelihood of getting collapses due to poor feedback from the glider. The risk of twisting is also strongly influenced by the seating position of the pilot. Flying in a laid back (reclined) position makes it much more difficult to react in time to prevent riser twisting. With the chest strap in a more closed position the glider also has more tendency to maintain a stable spiral. With the chest strap in a more open position, feedback from the glider is increased but stability is decreased.

GIN gliders are developed with GIN harnesses, which have an attachment point of approximately 40-48 cm (depending on size and model). EN/LTF certification test flights are carried out with the horizontal distance between the harness attachment points (measured between connector centrelines) set depending on the total weight in flight as follows:

Total weight in flight	< 80 kg	80 to 100 kg	> 100 kg
Width	40 ± 2 cm	44 ± 2 cm	48 ± 2 cm

In double-seat configuration, the horizontal carabiner distance (width) of the passenger's harness is set to the same width as the pilot's harness.

We recommend initially adjusting the distance of the chest strap according to the table. Then if necessary, make slight adjustments. In general, the carabiner distance should not be set too narrow!

For flight comfort and safety it is very important that you fly with a suitable, properly adjusted harness. In practice, it turns out that few pilots have a harness that suits their flying style and paraglider. If you have any questions or doubts regarding the use of your harness with the Fuse mini, please contact a GIN dealer or Gin Gliders directly.



**NOTE: Don't adjust your leg and shoulder straps too tightly. If you do, you may have difficulty sitting back into your harness after take-off.**

### Passenger harness

For passenger harnesses, in principle, all certified harnesses which have "GH" classification are suitable.

Make sure that the two harnesses (pilot and passenger) are compatible and have adequate back protection.

### Reserve

It is a mandatory requirement to carry an approved reserve for use in emergency situations where the paraglider 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.

For tandem flights, the rescue system lines must be attached to the carabiners between the riser and the spreader bar hangpoint. This ensures that if there is an emergency landing, the pilot and the passenger will land at approximately the same time.

The pilot must be able to deploy the reserve from any flying position.

It is a requirement in Germany that it should not be possible for the passenger to deploy the reserve. Please familiarise yourself with the relevant laws and regulations in your country before you fly.

For solo use, unlike with tandem flying, the rescue system lines must be attached to the special attachment points on the pilot's harness.

### Weight range

Be sure to fly your glider within the certified weight range given in the Technical Specification section. The weight refers to take-off weight: pilot, incl. clothing, glider, harness and equipment as well as the passenger weight.

The reactions are quite different at the upper- or lower weight range. If you fly at a high wing-loading, the glider shows dynamic flight behaviour with fast reactions. This may be an advantage in strong wind conditions, but considerable pilot skill is required.

The dynamics are reduced somewhat in the middle and lower part of the weight range.



**NOTE: Check your total flying weight by standing on weighing scales with all your equipment packed into your rucksack and then add on the weight of the passenger.**

**First flight**

Your instructor, dealer or a specialist must test-fly and inspect the paraglider before your first flight. The test-flight must be recorded on the paraglider information label.

Carry out your first flights only during stable weather, and 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.

# Flying the Fuse mini

## Preparation for launch

Follow a consistent routine every time you fly. This is very important for safety. We recommend the following procedure:

### General warnings and advice

Before flying, check the following:

- Are you in good physical and mental condition?
- Are you familiar and compliant with all applicable laws and regulations in your area?
- Are you within the certified weight range?
- Do you have the necessary insurance cover?
- Are you briefed thoroughly about the site, airspace and expected weather conditions of the day?
- Is your equipment and choice of site suitable for your level of experience?
- Do you have a suitable helmet, gloves, boots, eyewear and adequate clothing?
- Are you carrying some form of identification, in case of an accident? Take along a radio and mobile phone if possible.
- Do you fully understand how to safely fly your new wing? If not, have your instructor or dealer explain anything you are not sure about.

### Material check

Check the following condition of your paraglider and other flying equipment before every flight:

- Is the glider fabric free from tears or other damage?
- Are the lines free from knots, tangles or other damage?
- Are the brake lines freely and firmly connected to the handle?
- Is the brake line length correctly adjusted?
- Are the maillons connecting the lines and risers closed and secured?
- Is the glider dry?
- Are the risers and carabiners in good condition?
- Is your harness in good condition?
- Is your rescue handle secure and rescue pin in?

### Pre-flight check

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.

- Once you have arrived at the take-off, you should first take a look at the conditions: observe wind speed and wind direction, airspace, turbulence and thermal cycles.
- Check your paraglider, harness, rescue handle and pin, helmet and other equipment.
- Choose a wide starting place, as uniform as possible and free from obstacles.
- Put on your harness and be sure to close the leg straps! Then put on your helmet. Proceed in the same way with the passenger.
- Place the paraglider in a curved shape and sort the lines.

- Connect the riser to the carabiners of the spreader and the harness carabiners. Make sure that the carabiners are closed and that nothing is twisted.
- Check the functionality of the tandem spreaders and the correct connection with the pilot and passenger.
- Check your preferred setting of the trimmer.
- Check one last time that there are no knots in the lines, nothing is twisted and that the lines are not caught in vegetation or rocks. You must be particularly attentive in lighter winds.



**WARNING: If there are obvious creases in the glider as a result of tight packing or long term storage, carry out some practice inflations before your first launch and smooth out the trailing edge a little. This ensures that the flow profile is correct during launch. This is particularly important in low temperatures.**

### 5-point check

The 5-point check is carried out immediately before launch to check the most important safety points once again. It should always be carried out in the same sequence so that nothing is overlooked. The 5 points are:

1. Is your personal equipment, and that of your passenger, in order (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 intakes open?
3. Are all the lines untangled and are any lines under the canopy, are the tandem spreaders correctly attached and adjusted?
4. Does the weather, in particular wind direction and strength, allow a safe launch?
5. Are the airspace and launch area clear?

## Launching

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

### Forward inflation

We recommend a forward inflation in nil to light winds with closed or slightly opened trimmers. Pull up the glider with the lines stretched. It is not necessary to use any momentum to launch the Fuse mini and/or to start running with slack lines.

Lean forward positively and guide the 'A' risers smoothly upwards in an arc, keeping your elbows bent and hands at the level of the shoulders. The Fuse mini will inflate easily—there is no need to aggressively pull or push the risers. As the glider comes above your head, make sure that the canopy is correctly inflated, and that there are no knots or tangles in the lines before you decide to take-off. If you see a disturbance, do not launch. Immediately abort the take-off by stalling the paraglider. If the slope is steep, then just pull through one brake completely and run parallel to the slope.

### Reverse inflation

The Fuse mini is suitable for reverse inflation in light to strong winds. We suggest that you partially inflate your canopy, which allows you to untangle the lines. Make sure the lines are free from knots or

tangles. Check that the airspace and visibility are clear. Gently pull up the glider in an arc with the 'A' risers. When the glider is overhead, brake it gently if necessary, turn around and launch. If the wind is very strong, it is recommended to make a few steps toward the wing when inflating.

This method of inflation makes it easier for the pilot to control the rising of the canopy and is therefore recommended in strong winds.

#### Tips for paragliding take-off

- If the glider comes up slightly off-centre, make small corrections by moving towards the lower side.
- In stronger winds, be prepared to take a couple of steps towards the canopy as it inflates and rises.
- Launch the wing by pulling upwards in an arc, not towards you.
- Practice ground-handling regularly to improve your take-off skills!
- The pilot must work actively to keep the glider on the ground in higher winds (wind speeds from approximately 6 m/s), otherwise the glider may rise above the pilot unintentionally.



**NOTE: During reverse inflation and ground handling, care should be taken that the brake lines do not rub over the riser. This may cause damage to the riser or brake lines.**

#### Towing

Inflate the glider facing the direction of take-off. Laying out the glider on the ground in the shape of an arc helps ensure a smooth inflation. This significantly reduces the need for corrections and thus enables a controlled and safe start.

After the canopy has been pulled up to its highest point, the pilot rises from the ground by the tension of the tow line. Under no circumstances should the "start" command be given before the glider is completely under control.



**WARNING: The most common cause of stall on winch is releasing the A-risers too early while the glider is rising. The pilot should ensure that the canopy is above him before the "start" command is given.**

Any changes to direction using the brakes should not be carried out until the canopy is already above the pilot, as too much brake can cause the glider to fall down again or be towed in a non-flyable condition.

Major changes to direction should be avoided during the launch phase and before reaching a safe altitude. After having left the ground, the pilot will be slowly towed in a flat angle up to the safe altitude of 50 m. During this phase, the pilot must remain ready to run and must not sit back in the harness, so that it is possible to land safely in the event that the winch or tow rope fails. Ensure that the glider is flown with open brakes so that the angle of attack is not increased further by the brakes.

On a winch launch, the glider should if possible be steered only by weight-shifting. Brisk, forceful steering input with the brakes can be used to help correct direction, without braking the glider too much and stalling it.



**NOTE: In general, Gin Gliders recommends winch launching with a slightly accelerated glider so as to increase further the safety reserves for towing. The trimmers should**

**therefore be half-open on a winch launch. After release, return the trimmers to a position which suits the conditions.**

Towing requires special training and special regulations must be observed. These are:

- The pilot must have completed the appropriate training and hold a licence.
- The winch and release must have a certificate of compliance which covers the towing of paragliders.
- The winch operator must have undertaken training which includes the towing of paragliders.
- The Fuse mini may not be towed with more than the permissible towline tension.
- The paraglider must not under any circumstances be towed by motor vehicle or motor boat etc if you do not have the appropriate towing equipment and a suitable winch operator.

### **Attaching the towline release system**

The optimal attachment point for the towline release should be as close as possible to the system's centre of gravity. On a paraglider the ideal attachment point is level with the harness attachment point or directly on the risers. It is not essential to use a suitable tow adaptor, but it is recommended as it provides the pilot with greater safety during the towing phase.

For tandem use, the optimal attachment point is the passenger's harness hangpoint. Make sure that the passenger is not able to undo the release accidentally and make sure that the pilot is able to undo the release from any position.

Gin Gliders offers a safe, lightweight and easy tow release system, "Towing bridle". It attaches to the main carabiner and engages the speed system to enhance takeoff safety and climb performance. It is a two piece tow bridle for use with front mount reserves – with a three ring release. The bridle utilizes a straight pin which is preferred for reverse inflation style launches as the odds of a premature release are greatly reduced over curved pin systems.

If a webbing release system is used, there is an increased risk of lockout. This means that the glider does not fly towards the winch and control pressure by the pilot is not sufficient to correct this. You should therefore regularly check the position and alignment of the glider to the pilot during towing, as the towing rope hangpoint located well in front of the pilot encourages the glider to turn, and this may not be detected.



**WARNING: When using rigid tow releases, the release/shackle distance should be extended sufficiently (cord or webbing strap) and the release must be secured with a retaining cord so that it does not fly back (in the event of towline failure).**

**When using the release system attachment, ensure that the distance between the risers is not reduced (risk of twist).**

**If you are using a front-mounted reserve system, it is important to ensure before first launch that it can be deployed without any obstruction. If this is not the case, then only a webbing release system should be used.**

### **Knots or loops in the lines**

If you have taken off with a knot in the lines, you should wait until you have enough height and distance from other pilots before you attempt to loosen the knot. Control with weight-shift and gently brake the opposite side before attempting to open the knotted side by pulling on the brake line. Make



sure you don't fly too slowly and stall or spin the paraglider. If the knot does not open, land safely as soon as possible.

## In-flight characteristics

### Normal flight

"Trim speed" (brakes fully released) is the best glide speed in still air. The brake lines are used to adjust the speed according to the flight situation in order to ensure optimum performance and safety.

Minimum sink speed on the Fuse mini is achieved by light braking. In a normal flying position (knees parallel to the ground and your body slightly reclined), your hands should be holding the brakes at a level between your eyes and your shoulders. Use this speed for thermalling and ridge soaring.

Stall speed is approached by bringing your hands towards your hips. Notice the decreased wind noise and a significant increase in brake pressure.



**WARNING: 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 during the final stage of the flare.**

### Accelerated flight

Once you have become accustomed to flying the Fuse mini, you can practice using the trimmers, which allows improved glide in headwinds and greater penetration in strong winds. During your first few flights, familiarize yourself with your glider's speed range and corresponding brake positions and pressures.

It is important to remember to release any wraps on the brakes when using the trimmers. The brake length on the Fuse mini has been finely tuned to avoid any deflection on the trailing edge through the brake during accelerated flight. Applying brake while using the trimmers degrades performance and increases the chance of collapse.

When flying accelerated the glider reacts much faster to a collapse. Also the glider reacts more radically when a collapse happens during accelerated flight compared to flying at trim speed.

Open the trimmers by pressing the clasp of the trimmer buckle. Avoid flying accelerated near the ground, and be careful using the trimmers in turbulence. If you do encounter a collapse during accelerated flight, stabilize the glider and immediately close the trimmers.



**WARNING: Symmetrical braking with the main brake while using the trimmers creates an unstable profile and there is a danger of a front stall or other extreme flight manoeuvres. Therefore, avoid applying brakes when using the trimmers.**

### Turning

The Fuse mini performs best in turns when it is flown with sufficient speed and weight-shifting. Enter a turn with good airspeed, weight-shift and then apply the brake. Once established in the turn, regulate your speed and turn radius with weight-shift and the outer brake. Too much braking increases the sink rate.

Make your first turns gradual and progressive. Also remember that your harness and its set-up has an influence on the turning behaviour of the wing. The Fuse mini has extremely low negative tendency, so it can also be turned in a tight area by carefully pulling the inside brake line.

If the brakes are applied more, the bank attitude increases and the glider will fly a fast turn increasing in steepness, which will eventually become a spiral dive (further information on this is in the section “Spiral Dive”).

### Active flying

Practice active flying to eliminate collapses in all but the most turbulent conditions.

Keep tension on the brakes approximately equal to the weight of your arms. This allows you to stay relaxed and sensitively feel the internal pressure in the wing through the brakes. If you feel a loss of pressure in one or both sides of the wing, quickly apply the appropriate brake(s) to regain pressure. Release the brake promptly as soon as normal pressure is resumed.

If you miss the above timing and get a collapse, be sure to first raise your hands and release the brakes before considering any other corrective actions.

The Fuse mini has excellent pitch stability. Nonetheless, in turbulence or during manoeuvres, the glider may pitch. If the glider pitches in front of you, apply brake to slow it down. If the glider drops behind you, ease off the brakes to allow it to speed up. The objective is to reduce the pendulum effect by adjusting the speed of your glider so that glider and pilot are travelling at the same speed.

The same general principles also apply when gliding on bar.

Summary: "Active flying"

- The pilot sits upright in his harness, his view goes in the direction of the flight.
- He constantly responds to increasing and decreasing brake pressures with the aim of maintaining a constant pressure on the brake lines.
- The further in front of you the glider pitches, the larger the brake input required, but for a shorter duration.
- When brake pressures decrease, brake firmly; when brake pressures increase, ease off the brakes.



**WARNING: Never release the brakes when the glider is behind you but accelerating forwards.**

## Rapid descent techniques

Many flying situations call for a very rapid descent to avoid a dangerous situation, e.g. the up current from a cumulus cloud, an approaching cold front or a storm front.

Rapid descent methods should all be practised in calm conditions and at sufficient altitude so that a pilot is then able to employ them effectively if extreme conditions arise. Rapid descent techniques are divided into three different manoeuvres which increase the sink rate in a safe and controllable manner.

Big ears and spiral dives are generally the most common methods of descent. Big ears can achieve a moderate rate of descent with the advantage of forward speed and manoeuvrability.

Spiral dives attain higher rates of descent, but the g-forces can be significant and the manoeuvre is more technically demanding. ‘B-stalls’ have little or no advantages compared to the other methods of descent and therefore are not recommended in normal situations. Always try to avoid the need to use these descent techniques. Thoroughly check the conditions before launch, and pay close attention to how the day develops.

All of these options will also strain your paraglider and should be avoided if you want to preserve your paraglider. We recommend that you practice the rapid descent techniques under professional guidance during a safety training course.

### Spiral dives

The spiral dive is the most effective, but also the most demanding, method for making a rapid descent, and can allow sink rates of up to 20 m/s to be reached. It is suitable where there is a high ascent rate and little wind.

The Fuse mini fulfils the EN spiral dive requirements and has no tendency to remain in a stable spiral dive under normal conditions. The certification test flights are carried out with a defined carabiner distance (see chapter "Harness"). Deviations from this setting, unapproved harnesses or spirals with excessive sink can change the maneuver considerably; pilot action may be required. In such cases, exit the spiral by weight-shifting to the outside and progressively applying the outside brake.

Before entering a spiral, make sure you have adequate height for recovery. To enter the spiral dive, weight-shift and progressively apply the inside brake until the glider enters the spiral. As the glider accelerates into the spiral, centre your weight and control your rate of descent with weight-shift and outer brake.

To exit the spiral, check your weight is centred (or slightly towards the outside) and progressively release the inside brake. As the glider starts to exit the spiral, you may also choose to reduce the pendulum moment by briefly re-applying the inside brake.



**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. Take note of the following:**

- **The high g-forces experienced in steep or prolonged spirals may result in disorientation or even loss of consciousness.**
- **Always maintain ground clearance of 150 – 200m. The manoeuvre must be exited at this height above ground.**
- **Do not attempt to enter a spiral dive while in big ears. This places excessive forces on the paraglider and may result in structural failure.**
- **Spirals with open trimmers cause extreme high G-forces and may require an active recovery by the pilot.**
- **Frequent steep spirals may cause premature aging of your wing.**
- **Spirals with descent rates above 10 m/s are not recommended.**

**You must immediately deploy your reserve if you lose control of the glider and the sink rate and find yourself in a stable spiral. The high g-forces in the spiral may rapidly lead to a loss of consciousness which prevent later deployment of your reserve.**

### B-Stall

In the B-stall, a stall is provoked and the paraglider sinks vertically with a sink rate of approx. 8 m/s. The B-stall is suitable when there is an average ascent rate and little wind.

To enter a B-stall, grasp both of the B-risers on the mallions at the coloured mark. Pull both B-risers evenly down until the airflow is broken and the wing goes completely into vertical descent flight mode. The B-risers should then be held in this position to ensure a gentle descent.

Pull down the B-risers only until there is no airflow. If they are pulled down any further, the glider could go into a horseshoe. Check before and during the B-stall that the airspace beneath you is clear.

For recovery return the B-risers quickly and evenly into their normal position. The glider may go into a deep stall if they are released too slowly or into a negative spin if not released symmetrically. If you enter a deep stall, increase the speed by using the speed system or by pulling the A-risers forward.



**WARNING: The canopy speeds up after the B-risers have been released until the airflow returns. Under no circumstances should the brakes be applied at this time. This manoeuvre should be avoided at low temperatures. Pilots should be aware that this considerably increases the tendency to deep stall.**

### Big ears

Big ears are the simplest method for rapid descent and have 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.

To make the big ears maneuver more comfortable, the Fuse mini is equipped with split A-risers, which make the application of big ears easy. An additional cleat makes it possible to fix the outer A-lines so that they can be held in for an extended period. The lines can be pulled down and reset in the clamps. With big ears applied, the glider can be steered normally using the brake.

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 trimmers are generally also used in combination with big ears.

Start the "big ears" manoeuvre by pulling both outer A-lines downwards. This should fold down a sufficiently large part of the wing tips that the pilot does not then have to counteract the tendency to reopen. If the surface area which tucks under is too small ("ears" flapping, high holding forces), re-open the ears and then pull down and hold the A-lines a little more firmly.

The brake lines are held steady and the pilot uses weight-shift 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 line. Do not use the brakes unless you intend to exit big ears.

To exit big ears, release both A lines at the same time. If you have fixed the A-lines in the clamp, loosen them with a short pull and then quickly let the lines up. Apply brake progressively one side at a time to help re-inflation. Be careful not brake too deeply on both sides at the same time as this could cause a stall.



**WARNING: 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 very low temperatures. Pilots should be aware that this increases the tendency to deep stall.**

## Landing

Land on a large and obstacle-free landing site. Fly a straight final approach at trim speed into the wind. About one meter above the ground, pull both brakes smartly about half the control distance (30

to 40 centimeters), which allows the wing to pass into a short, almost ground-parallel glide (level flight path). Immediately before touching the ground, both brakes are then pulled completely.

The weaker the headwind, the more energetic and deeper the final braking must be. In the case of stronger headwinds, the final braking must not be too abrupt. In very strong winds, the brakes are not pulled down completely to avoid the glider climbing rapidly upwards and backwards. Instead, turn to face your wing as soon as your feet touch the ground without pulling the brake.

Stall the glider as rapidly as possible with the rear risers. Be prepared to run towards your wing.

Never perform spirals or steep turns near the ground. This may cause the pilot to pendulum dangerously.

Before landing, you should slip out of the seat board of the harness and assume an upright position. Never land without first getting up; landings on the backside are dangerous and can lead to injuries even if you use a good back protector.



**NOTE:** The Fuse mini has good basic speed, good glide and excellent energy retention. Give yourself enough space and bleed off speed gradually before flaring.



**WARNING:** Although the Fuse mini is remarkably maneuverable even in the lower half of the brake range, do not be tempted to make an excessively slow landing approach. Strong gusts and/or a steep wind gradient may cause any glider to suddenly lose altitude, or even stall.

Never let the leading edge crash to the ground, you risk damaging the seams and/or internal structure. Ground handling (especially on rough surfaces) will accelerate the aging process of your wing.

# 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. The best way to learn how to react calmly and correctly in a serious situation is to attend safety training, where you will learn how to manage extreme situations under the guidance of a professional.

Ground-training is another 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.

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.

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

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



**WARNING: 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.**

## SIV / Safety training

Due to the advanced design features of the paraglider, collapses incorrectly induced by the pilot may have more significant consequences than collapses which may occur in the course of normal flight (due to turbulence etc.).

Taking part in safety training is in principle advisable in order to familiarise yourself with your glider and the correct reactions in extreme situations. However, safety training also subjects your equipment to extreme loads.

### Material stress

During a safety training course, avoid subjecting the materials of your paraglider to excessive stress. Uncontrolled flight positions may occur which are outside the manufacturer limits of the paraglider. This may cause premature ageing, or even structural failure.

Stretching of the lines and/or canopy material after safety training can lead to a general deterioration in flight characteristics.

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



**WARNING: Be sure to perform any simulated collapses correctly. In particular, full speed asymmetric collapses performed incorrectly may result in unpredictable collapse behaviour and impulsive re-opening. This behaviour may require considerable pilot skill to manage safely.**

## Canopy Collapses

### Asymmetric collapses

Asymmetric collapses are caused by the stagnation point moving to the trailing edge of the glider. A negative angle of attack makes part of the canopy collapse and tuck under, and the glider may plunge down, turn away or spin.

Use active flying techniques to virtually eliminate collapses in normal flying conditions. Nevertheless, if you do get a collapse, stabilize your weight in your harness and do not allow yourself to fall to the collapsed side. Control your course with weight-shift and a little outside brake. The deflation should re-inflate spontaneously.

If the deflation does not re-inflate spontaneously, apply brake on the closed side in a smooth, progressive pumping action. Be sure not to apply too much brake too slowly as this may risk a stall. Remember that a partly collapsed wing has a reduced surface area and thus a higher stall speed.

If you get a collapse while in accelerated flight, release the speed bar immediately. Then apply the normal procedure for unaccelerated asymmetric collapses.



**WARNING: After a large collapse, an instinctive reaction to the body falling is to attempt to hold something. This can result in the pilot unintentionally applying brake, which prevents proper recovery. Always make sure you have fully released the brakes (including any wraps taken) after any incident. Let the glider fly.**

### Cravat / glider wrapped around lines

A cravatte occurs when a wing tip becomes stuck between the glider lines, for example, following a bad take-off preparation. On the Fuse mini, a cravatte is unlikely to occur. If you do get a cravatte, first control your direction. Do this by using weight-shift and enough counter-brake to stop the turn, but not too much to risk a stall of the opposite side.

A cravat can generally be opened by a short, fast pull on the brake line of the cravatted side. If not, on the Fuse mini, there is a separate stabilo main line that goes down to the riser. This line usually becomes slack in the event of a cravat. Pull this line down completely until it becomes tight and the cravat normally comes out.

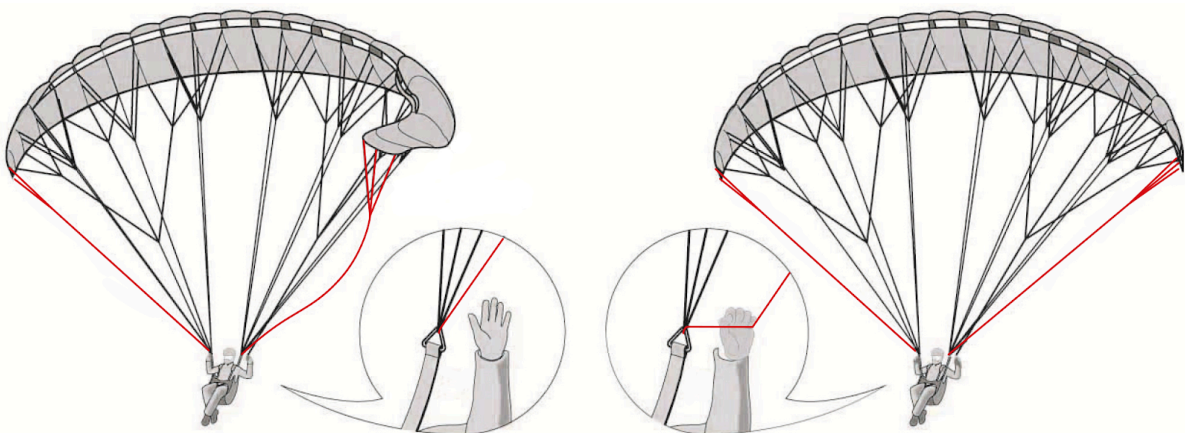


Figure: Grabbing the stabilo main line



**WARNING: Counter-steering too strongly on the inflated side of the glider can result in a stall and to further uncontrolled flight manoeuvres (cascade of events).**

**Always remain aware of other aircraft and terrain when dealing with a problem on your wing. Do not hesitate to throw your reserve parachute if the rotation in a cravatte is increasing uncontrollably, especially if you are at low altitude.**

### Symmetric collapses (Front stall)

A negative angle of attack can also cause part or all of the leading edge of the glider to collapse.

Symmetric (frontal) collapses will normally re-open without pilot input. The paraglider will pitch forward and then regain speed. Assist this process if necessary with a symmetric application of the brakes. Take care not to apply too much brake for too long as this may stall the wing.

In the case of extreme front stalls across the entire wing chord, the wing tips may move forward making the glider form a U-shape. Again, recovery is by light symmetrical braking on both sides. Take care that both wingtips return to normal flight evenly.



**WARNING: If you get a collapse while in accelerated flight, release the speed bar immediately. Then apply the normal procedure for unaccelerated asymmetric collapses.**

## Types of stall

When a paraglider 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 breaking away. This happens in particular when the angle of attack is too great.



**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.**

There are three different types of stall in paragliding.

### Deep stall (parachuting, stable stall)

Paragliders can go into a deep stall for a variety of reasons: brake lines too short (no slack), old or damaged glider material which therefore has increased level of permeability, altered trim/line length and changes to profile characteristics caused by moisture (e.g. flying in rain). Paragliders have a particular tendency to stall if the wing-loading is too low. An out-of-trim glider, caused by changes in line lengths due to prolonged use, may also have a higher deep stall tendency.

In a deep stall, the airflow from the front reduces and the glider goes into a stable flight attitude without forward momentum. The paraglider sinks almost vertically at 4-5m/s and there is noticeably less flight noise.

The Fuse mini has no tendency to get into 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.



If you have a speed system, you can also use it to accelerate, so that the glider goes into a normal flying position from the deep stall. After you have landed, the glider and the length of the lines must be checked.

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 never make big ears! Apply speed bar until you are confident that the wing has dried out.



**WARNING: Never apply the brakes, including any wraps taken, in a deep stall.**

### 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 paraglider 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.

Do not take wraps on the brakes during a full stall. Keep your hands close to the body and under the harness seat plate during the stall. If the canopy is in a stable full stall, it will move forward and backward. To exit the full stall, slowly release the brakes, making sure that this is done symmetrically. After that, the brakes are completely released when the glider canopy is filled and in front of the pilot. This prevents the canopy from pitching too far forward.

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.



**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.**

### Spin

The spin is a stable flight maneuver, 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!

Depending on the type of release and the dynamics of the rotary movement, the canopy may dive forward on one side and collapse asymmetrically. In the case of a longer spin, the pilot may release the brakes only at the moment when the glider is in its rotary motion above or in front of the pilot. If the spin does not stop, check whether you have released the brakes fully, including any wraps!

## 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.

### Emergency steering (rear riser steering)

If for some reason the brake lines are not working, e.g. if the knot on the brake handle has come undone or a brake line is defective, the Fuse mini can also be steered and landed using the rear risers.

In this case, stall happens more quickly and the pilot must compensate for the changed flight behaviour by pulling carefully on the risers.

### Flying in the rain

We strongly advise you not to fly in the rain on any paraglider including the Fuse mini. 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 unable 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. Attaching adhesives to the glider which are large, heavy, or made of unsuitable material may result in revocation of the certification.

### 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.

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.

# Storing, care, maintenance and repairs

## Storing the paraglider

### Packing the paraglider

The Fuse mini can be packed with all the usual methods. To ensure a long life of the profile reinforcements it is very important that you pack the paraglider carefully. It is therefore recommended that you pack the Fuse mini as shown in the following illustrations.

The leading edge reinforcements (Mylar and Rigifoil 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, creating an altered air inflow which 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.

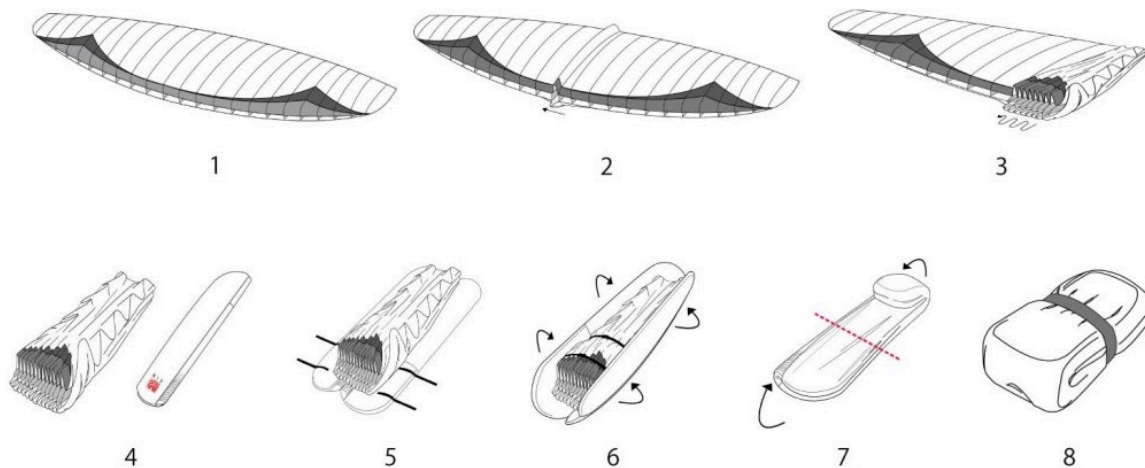


Figure: Packing the Fuse mini

1. Spread out the paraglider completely on a smooth surface. Do not drag the paraglider across any rough surfaces such as gravel or asphalt. This may damage the seams and surface coating.
2. Start from the center to stack the profiles of each side of the wing on top of each other.
3. Proceed like this until the wing tip. 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

Gin Gliders has a wide range of different rucksacks. Choose between lightweight hike 'n fly or indestructible classic models, available in various sizes to match your flying equipment.

For details please see [www.gingliders.com](http://www.gingliders.com)

The backpack type/size included in delivery depends on the paraglider model/size. Therefore, there are different ways to pack the glider, depending on the personal preferences, the harness and the equipment. To maximize carrying comfort, the following method is recommended: First, place the glider inside the harness and then put the top of the harness in the bottom of the rucksack with the glider side next to the back of the rucksack.

The tighter the rucksack is packed, the more comfortable it will be to carry. Gin Gliders offers a wide variety of rucksack sizes and models. They are available as an optional extra for pilots that require it.

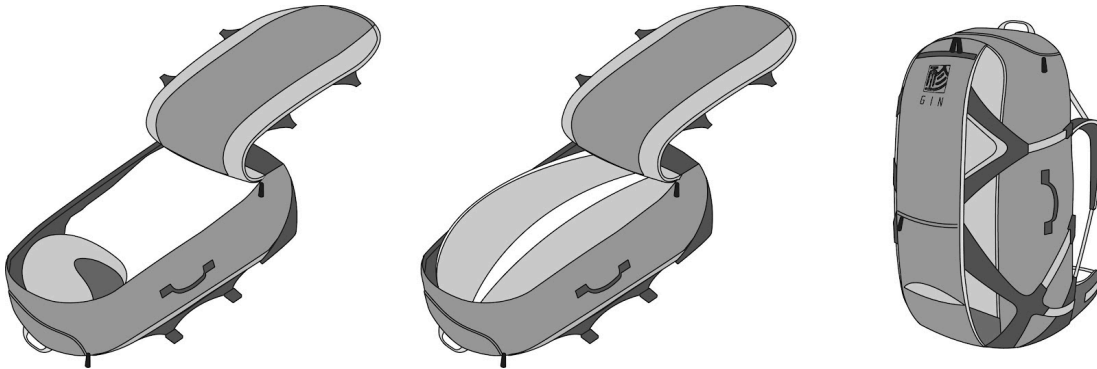


Figure: Packing the rucksack

### Storing and transporting the glider

Even if your paraglider 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 paraglider 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 paraglider near any chemicals. Petrol, for example, causes the material to disintegrate and can cause considerable damage to your paraglider. When your equipment is in the car boot, keep it as far away as possible from any spare petrol cans or oil containers.

The Fuse mini 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 paraglider 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 Fuse mini have been carefully selected for maximum durability and performance. Nevertheless, following the guidelines below will keep your paraglider 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:

- Don't ground handle or take-off on abrasive surfaces.
- To move the paraglider to another spot, don't drag it across the ground. Pick it up and carry it.
- Violent shocks to the canopy (e.g. when the canopy crashes to the ground leading edge first whilst ground handling). This stresses the seams and can even cause the cell to explode.
- Don't repeatedly inflate the glider and allow it to crash back down. Step towards the wing as it comes down to take the force out of this action.
- 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.
- Don't sit on your rucksack when your glider is packed inside.

### 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 paraglider 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 paraglider is stored wet and the fibres may rot, particularly when it is warm. This can make the paraglider 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 Fuse mini 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.

Dyneema lines, for example, are very temperature-sensitive and can be permanently damaged at temperatures above 75° C. Therefore your glider should never be stored in a hot car especially during summer.

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 rods are used in the Fuse mini (rigid construction), which help maintain the shape of the leading edge and the stability of the canopy. To ensure that the rods keep their shape, it is important that you pack the glider as described in the section "Packing the paraglider".

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

## 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 breaking 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 paragliders. The information required is set out in the airworthiness requirements.

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

## Regular inspections

The following parts and materials must be inspected regularly for damage, abrasion and correct operation, e.g. after landing:

- Risers and quick-links
- Lines
- Fabric

## Lines

Measuring the length of the lines is part of the regular paraglider inspection. The lines have a considerable influence on flight behaviour. Correct line length and symmetry are also important for performance and handling. Gin Gliders therefore recommends an inspection every 50 to 100 hours or once a year.

Environmental conditions such as high temperatures or moisture can affect line length. Check the line length regularly, particularly if you notice any change in launch or flight behaviour. The line length should be checked if you have landed in water or if the lines have got wet through. Lines age and lose strength even if the paraglider is used infrequently or not at all. This can affect the safety and function of your paraglider.

Signs of wear are slight bumps or changes in flying characteristics. The lines must then be replaced immediately. Use only inspected and approved lines, which can be obtained through Gin Gliders.



**WARNING: A damaged line can result in loss of control of the glider. Always replace lines which are damaged. If you need to replace damaged or worn-out parts, use only original parts or approved parts from the manufacturer.**

**Do not under any circumstances use knots to shorten the lines. Any knot will weaken the line considerably and may cause the line to break in case of high load. The overhand knot and bowline knots described are permitted only for connecting the main brake lines/brake handle.**

## Inspection periods

The inspection periods and instructions apply without restriction to all purposes in the private or professional sector as well as in training. 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.

The following inspection periods apply to the Fuse mini:

- 36 months or after 150 hours (including ground handling), whichever is sooner
- subsequent inspections should be carried out every 24 months or 100 hours (including ground handling), whichever is sooner

Ground handling time must be at least doubled when calculating the total hours of use because of the increased wear and tear on the glider.

If you use the Fuse mini in harsh conditions (sand, dust, stones etc.), we recommend a biannual check.

Additional inspections should be performed following a crash or violent landing on the leading edge, or if you note a deterioration of performance or behaviour.

The condition of all components and materials must be checked with the utmost accuracy during testing in accordance with the GIN inspection instructions. These results, and an overall assessment of the condition, are part of the check log.

Service and repair shops authorized by Gin Gliders are in possession of the Gin Gliders inspection instruction, which contains all the necessary procedures, equipment and additional technical information about the Fuse mini, such as single line lengths, sewing and further material and processing guidelines.

### 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 paraglider 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 and place / name of the inspector) and be entered near the glider information/certification sticker.

Pilots are able to carry out the inspections themselves or appoint a third party to do so (e.g. manufacturer/importer), provided that the requirements are all fulfilled. However, if this is done, the liability and warranty of Gin Gliders will lapse.

GIN and the commissioned test laboratory recommends that inspection is carried out by the manufacturer/importer or by an authorised inspection agent.

## 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 Fuse mini, 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.



**WARNING: Do not attempt to perform repairs unless you have the knowledge, experience, materials and tools needed to do the job properly.**

### GIN quality and service

We take pride in the quality of our products and are committed to putting right any problems affecting the safety or function of your equipment and which are attributable to manufacturing faults. Your GIN dealer is your first point of contact if you have any problems with your equipment. If you are unable to contact your dealer or GIN importer, contact Gin Gliders directly via our website.



# Glider characteristics, illustrations and technical data

## Glider categories and guidelines

Flight behaviour and response to disturbances are loosely correlated with the results of the EN/LTF tests. The complexity of the paraglider 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.



**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.**

### Glider category

The Fuse mini was developed and tested for use solely as a paraglider for foot launch and for winch launch. Any use other than as intended is prohibited.

### EN/LTF certification

The Fuse mini received EN-B classification in the final classification by the licensing body.

### Description of flight characteristics

A paraglider with good passive safety and forgiving flying characteristics, with some resistance to departures from normal flight.

### Suitability for training

The Fuse mini is generally suitable for use as a training glider (as long as an EN-B glider is permitted for training in your country).

### Paramotoring

The Fuse mini is not intended for paramotoring. Details of GIN wings suitable for motorized flight can be found in the paramotoring section of our website ([www.gingliders.com](http://www.gingliders.com)).

### Solo flying

The Fuse mini is also suitable for solo flight, certified in combination with standard risers. It is aimed at very heavy pilots who appreciate direct handling, very good glide performance and excellent thermalling characteristics.

### Aerobatics

Your Fuse mini was not developed or tested to be used for aerobatics (acro).

Legal regulations differ greatly between countries. The respective national laws or guidelines must be followed under all circumstances.

When performing acrobatics, there is a risk of unpredictable flight attitudes, which could lead to damage to material and structural failure.

### **Description of pilot skills required**

#### **Target group and recommended flying experience**

For all pilots, including training pilots of all levels. For thermal flyers and cross country pilots who have regular flying practice (a minimum of 20-30 hours airtime per year) and advanced flying knowledge.

#### **Normal flight requirements**

The flight- and control behaviour of paragliders of this class requires an effective active flying style with precise and sensitive control inputs.

#### **Requirements for incidents and quick descents**

The behaviour of the glider after disturbances poses increased demands on the currency and reaction speed of the pilot. The pilot should have sufficient practical knowledge to avoid and control the most common disturbances, especially side and front collapses.

Flight maneuvers, such as a steep spiral or a B-stall, make higher demands on the pilot due to the overall more demanding handling behaviour. These maneuvers should only be attempted where the pilot has good practical knowledge.

If the pilot is insufficiently experienced, a safety training session is recommended.

### **Manufacturing and delivery**

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.

Your glider will be delivered to you with the original trim settings which correspond to the tested configuration. Do not make any modifications, such as changing the risers or altering the line lengths. This would invalidate the certification and is potentially dangerous.

## Overall illustration

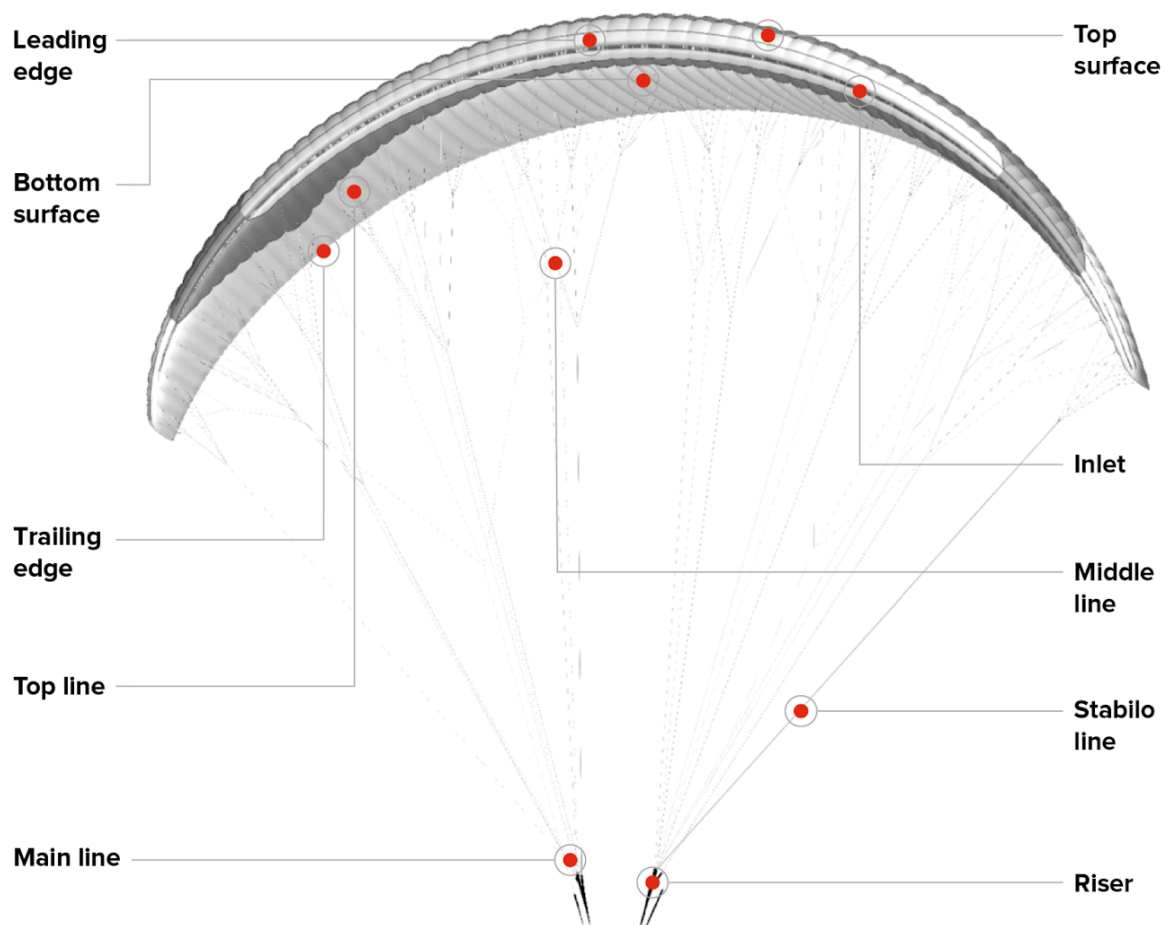


Figure: Overall Illustration

## Technical data

Size	32	35
Area (flat) [m <sup>2</sup> ]	32.00	35.00
Area (projected) [m <sup>2</sup> ]	27.52	30.10
Span (flat) [m]	12.52	13.10
Span (projected) [m]	10.03	10.49
Aspect ratio (flat)	4.90	4.90
Aspect ratio (projected)	3.66	3.66
Cells	49	49
Glider weight [kg]	6.15	6.55
Weight in flight [kg]	90-190	90-210
EN/LTF	B	B

## Riser and speed system

### Riser

The Fuse mini riser changes the angle of attack during accelerated flight and has some features specially developed for the glider.

The Fuse mini has separate A-risers that make it easier to perform the big ears manoeuvre. A line clamp on the D-riser also allows the outer A-lines to be fixed on the riser so that they do not have to be held for a long period during flying. The lines can be tightened and re-attached to the clamp. The advantage of fixation is that the paraglider can be controlled normally via the brakes during the big ear manoeuvre.

Risers with 12 mm Kevlar webbing, which are 174g lighter than the standard 20mm risers, are available as an option. If you would like to change the riser please contact your Gin Gliders dealer for further information.

### Riser diagram

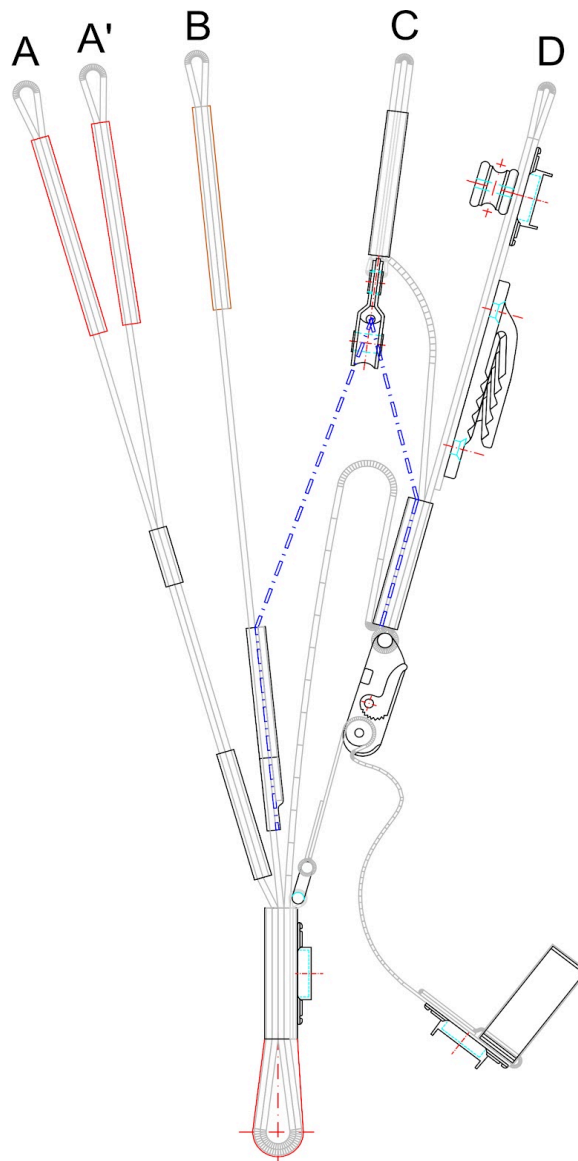


Figure: 20 mm webbing risers (standard)



Figure: Optional Fuse mini riser (12 mm Kevlar version)

#### Riser lengths

Riser lengths [mm] *	A	A'	B	C	D
Trim speed	400	390	400	400	400
Open trimmer size 32	400	390	400	425	450
Open trimmer size 35	400	390	400	460	520

\* incl. carabiner (Maillions)

#### Trimmer

The Fuse mini already has a high basic trim speed, but this can be increased considerably by using the trimmer system. It is particularly useful if there is a strong headwind, for valley crossings or to leave a dangerous area quickly.

Pulleys on the C-risers reduce the drag of the trimmer system and produce an easy and smooth operation.

The C and D-risers can be altered in length using the trimmer. This decreases the canopy's original angle of attack and the glider's speed increases.

For take-off, a setting around the neutral point (all risers have the same length) is recommended. The trimmer is loosened by a trimmer buckle and closed over the trimmer webbing.



**WARNING: It is recommended that you do not use the trimmer system in turbulent areas, because of the increased risk of collapse.**

## Spreader

The Fuse mini was tested and approved with Gin Gliders tandem spreaders. Systems from other manufacturers should not be used as they can change flight characteristics. Three different tandem spreaders are available for the Fuse mini.

**WARNING:** As a carabiner for the main suspension we recommend using steel carabiners with sufficient breaking load. Please familiarise yourself with the respective national regulations. Aluminium carabiners should not be used for tandem flying.

### Spreader bars (hard)

The rigid tandem spreader offers several hang-up options to compensate weight and/or size differences between pilot and passenger. The size compensation is achieved by hooking the passenger carabiners into the upper or lower loop on the front part of the spreader. Always make sure that the passenger is connected to the same loop on both sides.

A stopper on the spreader bars makes it much easier and faster to pull and release the big ears. This makes it much easier and faster to pull and release the big ears. Besides, the pilot can still use the brakes to steer the glider, useful, for example, to control the glide ratio on top landings.



Figure: Rigid 30 mm spreader bars (hard) for Fuse mini

### Supple spreader (soft)

The supple spreader bar is designed for tandem flying. Ideal for pilots who want a more natural feel in flight with the passenger's weight shifted closer to the pilot.

With the supple spreader, the Fuse mini can be mounted on three different main suspension positions.



Figure: Supple spreader (soft) for Fuse mini

### Light spreader (soft light)

The second version of our light tandem spreaders weighs only 208 g and comes with reserve connection lines. For the connection we recommend Peguet 5 mm Stainless Steel Maillon Rapides (not included).



Figure:  
Light spreader (soft light) for Fuse mini

## Line system and brakes

### Line system

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

With the brake lines, the individual levels are bundled at the end with the main brake line. This runs through the low friction ring 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 (or plastic clips) and attached to prevent the lines from slipping and to ensure that they sit in the correct position.



**Note: Some GIN gliders are supplied with additional line loops on the carabiners of the riser. These may be used by professional check-up workshops to re-trim the paraglider during a scheduled service check.**

### Brake line adjustment

#### Factory setting

The brake lines of the Fuse mini are set to the length that was used for the EN certification test flights. These line lengths have been finely tuned by the GIN test pilots, and it should not be necessary to adjust them.

The brake line length is tuned so that there is slack in the brake lines when the glider is in fully accelerated flight. Therefore, the brakes are quite slack at trim speed, and to take up that slack in soaring flight, it is common to fly with half a wrap on the brakes and hold the handles on the knot. However, care should be taken to release the wraps in any extreme situation.

If you do need to make adjustments to suit your harness, body and flying style, we strongly recommend that you test fly the glider after every 2 cm of adjustment. There should be a minimum of 10 cm 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 brake line knot for the brake handle attachment as shown in the diagram:



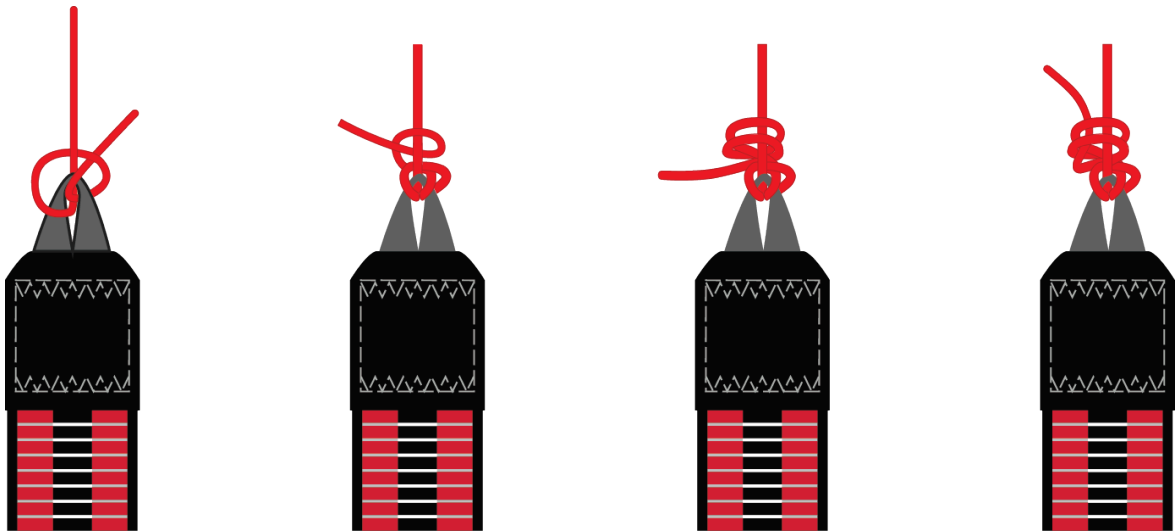


Figure: Brake line knot

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

#### Incorrect adjustment

If the brake lines are too long, the paraglider 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. Changes to the braking distance should always be made in small increments of no more than 2 to 3 cm and must be tested on a training slope. The left and right brakes must be adjusted symmetrically.

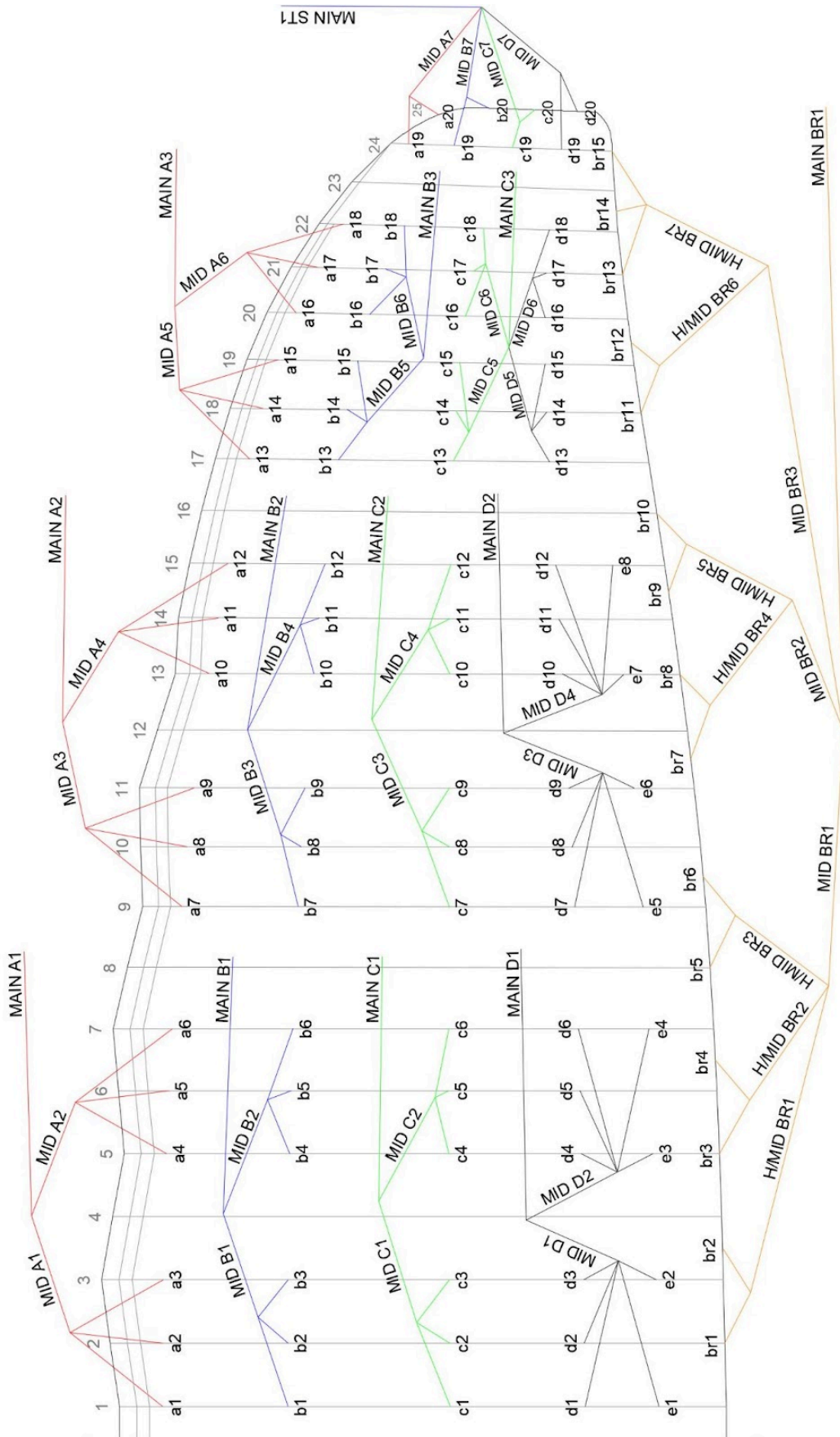
If the brakes are shortened, care must be taken that the paraglider is not slowed down in trim and accelerated flight. Safety issues may arise and performance and launch behaviour may deteriorate if the brake lines are shortened too much.

If the brake lines are too short, the following risks could arise:

- there could be an early stall
- the paraglider does not launch well and there is a risk of deep stall
- the paraglider shows dangerous flight characteristics
- the trailing edge of the paraglider is braked in accelerated flight which, in an extreme case, could cause a frontal collapse

**! WARNING:** Environmental conditions can also lead to the brake lines shortening. You should therefore check brake line length regularly, particularly if there is any change in launch or flight behaviour.

# Line layout



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## Materials

### Canopy fabric

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Upper surface leading edge	Myungjin Textile MJ R/S 40MF
Upper surface trailing edge	Myungjin Textile MJ R/S 32MF
Lower surface leading edge	Myungjin Textile MJ R/S 40MF
Lower surface trailing edge	Myungjin Textile MJ R/S 29MF
Ribs	Porcher Skytex 40 hard

### Lines

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Top	Edelrid 7950 080
Middle	Edelrid 7343 140   190   230
Main	Edelrid 7343 140   230   420
Main Brake	TGL 400

### Riser

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Güth & Wolf 20 mm Polyester

### Line shackle

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Stainless steel 3.85 mm

### Canopy thread

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Amann & Söhne - Mill Faden 150D/3  
Polyester bonded

# Appendix

## Glider details

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

## Pilot details / Proof of ownership

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



## Addresses

### **Gin Gliders Inc.**

2318-32, Baegok-daero, Mohyeon-myeon,  
Cheoin-Gu, Yongin-si, Gyeonggi-Do  
17036 Korea  
Fon: +82-31-333-1241  
Fax: +82-31-334-6788  
[www.gingliders.com](http://www.gingliders.com)  
[twitter.com/GIN](https://twitter.com/GIN)  
[facebook.com/gingliders](https://facebook.com/gingliders)

### **DHV**

Am Hoffeld 4  
Postfach 88  
83701 Gmund am Tegernsee  
Germany  
Fon: +49 (0) 8022 9675 - 0  
Fax: +49 (0) 8022 9675 - 99  
Email: [dhv@dhv.de](mailto:dhv@dhv.de)  
[www.dhv.de](http://www.dhv.de)

### **Air Turquoise SA**

Route du Pré-au-Comte 8  
1844 Villeneuve  
Switzerland  
Fon: +41 219 65 65 65  
Fax: +41 219 65 65 68  
[www.para-test.com](http://www.para-test.com)

### **DGAC**

Bâtiment 1602  
9 rue de Champagne  
91200 Athis-Mons  
FRANCE  
[www.ecologique-solidaire.gouv.fr/ulm-introduction](http://www.ecologique-solidaire.gouv.fr/ulm-introduction)

### **DULV**

Mühlweg 9  
71577 Großerlach-Morbach  
Germany  
Fon: +49 (0) 7192 93014 - 0  
Email: [info@dulv.de](mailto:info@dulv.de)  
[www.dulv.de](http://www.dulv.de)

### **FAI - Fédération Aéronautique Internationale**

Maison du Sport International  
Av. de Rhodanie 54  
1007 Lausanne  
Switzerland  
Fon: +41 21 345 1070  
Fax: +41 21 345 1077  
[www.fai.org](http://www.fai.org)

### **Aerotest-FFVL**

1 Place du Général Goiran  
06100 Nice  
France  
Fon: +33 647 219 431  
<https://labo.ffvl.fr>

[www.gingliders.com](http://www.gingliders.com)

