

# *Leopard*

## User manual

v1.0 May 2019



G I N

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

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

**Because it is impossible to anticipate every situation or condition that can occur while speedflying/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.**

**Many countries have specific regulations or laws regarding speedflying/paragliding activity. It's your responsibility to know and observe the regulations of the region where you fly.**

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.

© Gin Gliders Inc

The information in this manual is provided for guidance only and is subject to change without notice. This manual is not intended as a comprehensive assembly, use, service, repair or maintenance manual. Please see your dealer for all assembly, service, repairs or maintenance. Your dealer may also be able to refer you to classes, clinics or articles on paraglider use, service, repair or maintenance.

# 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.

Your GIN paraglider has been designed to meet all EN/LTF 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.

Keep this manual for reference, and please pass it on to the new owner if you ever re-sell your paraglider.

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

# Contents

<b>Gin Gliders</b>	<b>7</b>
Manual	7
Gin Gliders website	8
Gin Gliders and the environment	8
Respect for nature and the environment	8
Environmentally-friendly recycling	8
<b>Safety</b>	<b>9</b>
Safety advice	9
Safety notices	9
Liability, warranty exclusion and operating limitations	10
Liability and warranty exclusion	10
Operating limitations	10
Before the first flight	11
Harness	11
Reclined harnesses	12
Reserve	12
Weight range	12
Overload	12
First flight	13
<b>Flying the Leopard</b>	<b>14</b>
Preparation for launch	14
Material check	14
Pre-flight check	14
5-point check	15
General warnings and advice	15
Launching	15
Forward launch	15
Reverse launch	16
Tips for paragliding take-off	16
Knots or loops in the lines	16
In-flight characteristics	16
Normal flight	16
Accelerated flight	17
Turning	17
Active flying	17
B-riser control	18
Rapid descent techniques	19
Spiral dives	19
G-chute	20
B3-Descent	20
Big ears	20
B-Stall	20

Landing	20
Range of use	21
Towing	21
Attaching the towline release system	22
Paramotoring	22
Tandem paragliding	23
Aerobatics	23
<b>Dangerous situations and extreme flying</b>	<b>24</b>
Dangerous situations	24
SIV / Safety training	24
Material stress	24
Canopy Collapses	25
Asymmetric collapses	25
Cravat / glider wrapped around lines	25
Symmetric collapses (Front stall)	26
Types of stall	26
Deep stall (parachuting, stable stall)	27
Full stall (dynamic stall)	27
Spin	28
Other tips for dangerous situations	28
Cascade	28
Emergency steering (rear riser steering)	28
Flying in the rain	28
Advertising and adhesives	29
Overloading	29
Sand and salt air	29
Temperature range	29
<b>Storing, care, maintenance and repairs</b>	<b>30</b>
Storing the paraglider	30
Packing the paraglider	30
Rucksack	31
Storing and transporting the glider	31
Care	32
Ground handling	32
Fabric	32
Lines	33
Rigid construction	33
Cleaning	33
Maintenance	34
Type designation	34
Regular inspections	34
Lines	34
Inspection periods	35
Validity of inspection	35
Inspection by the pilot	35

---

Repairs	35
Gin Gliders workshops	35
Small repairs to the glider	36
GIN quality and service	36
<b>Glider characteristics, illustrations and technical data</b>	<b>37</b>
Glider categories and guidelines	37
Glider category	37
EN/LTF certification	37
Description of flight characteristics	37
Suitability for training	37
Description of pilot skills required	37
Target group and recommended flying experience	37
Normal flight requirements	38
Requirements for incidents and quick descents	38
Manufacturing and delivery	38
Overall illustration	39
Technical data	39
Riser and speed system	40
Riser	40
Riser diagram	40
Riser lengths	41
Speed System	41
Line system and brakes	42
Line system	42
Folding lines	42
Brake line adjustment	42
Factory setting	42
Incorrect adjustment	43
Line layout	44
Materials	45
<b>Appendix</b>	<b>46</b>
Glider details	46
Pilot details / Proof of ownership	46
Inspections and repairs overview	47
Notes	47
Addresses	48

# 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 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!

## Manual

We recommend that you familiarise yourself with your new paraglider 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 paraglider in various situations, and explain how to get the best out of your paraglider. There are no special flying procedures and / or configurations apart from those detailed in this manual.

Information in this manual on design of the paraglider, technical data and illustrations are subject to change. We reserve the right to make changes without prior notification.

The manual complies with the EN airworthiness and forms part of the certification.

It is comprised of:

1. Manual (this document):  
Instructions on getting started and using the paraglider
2. Inspection Information:  
General instructions and guidance on carrying out the regular inspection of paragliders
3. Glider details:  
Pilot details , proof of ownership and inspections and repairs overview

This manual was current at the time of publication, and may also be downloaded from the GIN website.

## Gin Gliders website

Gin Gliders has a comprehensive website, which provides additional information about the Leopard, 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, 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. 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

**WARNING: 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, and could lead to serious injuries or even death.**

## Safety advice

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

In Germany, paragliders 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 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 and airworthiness instructions which are issued in respect of GIN products. The paraglider 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 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 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. The certification and warranty shall be rendered invalid if there are changes of any kind (incl. paraglider 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 paraglider 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 paraglider 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 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 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 approved

## Before the first flight

**WARNING: 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. Any changes or improper repairs to this paraglider shall render invalid the certification and warranty.**

### Harness

The Leopard 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 weightshift.

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

We recommend adjusting the distance of the chest strap according to the table and, if necessary, to adapt easily. 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 Leopard, 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.**

### Reclined harnesses

Reclined harnesses are generally completely enclosed and often have a very low main attachment point. Active flying is very different with them than with an upright harness. To achieve the same level of efficiency and safety in flight with a reclined harness which you are accustomed to with an upright harness, you must systematically learn the appropriate techniques and gain a good deal of experience.

If any problems or disturbances are encountered when flying with a reclined harness, the pilot must immediately assume an upright seating position. Extreme flight manoeuvres flown in a reclined position drastically increase the risk of twist. In addition, pilots often underestimate the reduction in control travel caused by flying an extreme flight manoeuvre.

There is an increased risk of twist when using a reclined harness if a large section of the canopy collapses. If there is an asymmetric collapse and the pilot tips sideways, the resulting twist around the vertical axis with a poorly positioned harness leads to a reduction in control travel. This quickly causes an unintended stall on the open side.

### 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.

### 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.

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.

### Overload

The EN 926-2:2013 describes the weight measurement with: "All weights are subject to an acceptable tolerance of  $\pm 2\text{kg}$ ". Therefore a slight overload of the wing would be within EN tolerances. However, flying over the maximum weight further increases the dynamic flight behaviour. In small bubbles, the wing has more horizontal momentum and less tendency towards lifting. A test flight is always recommended if in doubt.

**Note: 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.**

**First flight**

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.

**WARNING: Brand-new gliders must be flown first in calm conditions. It is recommended to fly light spirals in both directions so that the handshake connections between the lines become tight up. In addition, the plastic rods stretch the sail seam during the first flights, making the sail smoother.**

# Flying the Leopard

The Leopard was developed for performance and competition pilots with extensive flying experience. The basic types of flying described below should be second nature for such pilots, but have been included in this manual for the sake of completeness.

## Preparation for launch

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

### 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.
- Place the paraglider in a curved shape and sort the lines.
- Connect the riser to the harness carabiners. Make sure that the carabiners are closed and that nothing is twisted.
- Connect the speed system of the riser and harness with the Brummel hooks.
- 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 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?
4. Does the weather, in particular wind direction and strength, allow a safe flight?
5. Are the airspace and launch area clear?

## 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.

## Launching

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

### Forward launch

We recommend a forward launch only in nil winds. Lay out the canopy in a half-moon shape and use a short burst initially to get the glider off the ground, once the glider starts to come up it is best to not continue to accelerate but to let the glider fly upwards itself. It is important to guide the 'A' risers smoothly upwards in an arc, keeping your elbows bent and hands at the level of the shoulders. This will avoid that the tips are coming forward and creating a U-shape.

Laying out the glider with a distinctive V-shape and aggressively pulling or pushing the risers can cause the tips to come in front resulting in a failed take-off.

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. Check that the airspace and visibility are clear. If everything is in order, move forward decisively off the take-off.

## Reverse launch

The reverse launch technique is generally recommended for the Leopard. Take the brakes and turn around to face the wing. Pass one set of risers over your head as you turn. 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.

This method of launch 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 launch 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.**

## 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 Leopard 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 Leopard, you can practice using the speed system, 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.

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.

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

Apply the speed system by pushing the speed bar progressively with your feet. 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.

**WARNING: Never apply brakes when using the speed bar.**

### Turning

The Leopard performs best in turns when it is flown with sufficient speed and weight-shifting. Enter a turn with good airspeed, weightshift and then apply the brake. Once established in the turn, regulate your speed and turn radius with weightshift 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 of the turning behaviour of the wing. The Leopard 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 Leopard 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.**

### **B-riser control**

The Leopard responds very nicely to B-riser control to fluidly pilot the wing through turbulence. The aim is to control pitch so that the wing stays directly above you. B-riser control can also be used for steering.

Following lifting lines using the B-risers can make a huge difference to flight performance and gives the Leopard pilot a very satisfying feeling of being connected to the air movements. A pilot fully in tune with the Leopard can use these B-riser inputs to follow the lifty lines that lead to the cores of thermals.

With the speed system applied, the B risers can be pulled downwards to directly control the angle of attack of the glider. Pulling downwards pitches the nose up, which increases the angle of attack and reduces the chordwise compression in the sail from the lines. This makes the wing more tuck-resistant.

If you use B-riser control keep the brake handles in your hand and loosen any wraps of the brake line. The control movement is subtle and fluid – only small movements are required. It is important to recognize how much B-riser movement is needed to return the glider to trim speed. It is good practice to glide with gentle tension applied to the B-risers (pulling them downwards about 3 to 5 cm) so that you can feel the inputs from the wing. Those inputs warn you when turbulence is coming, but also allow you to feel the lifty side of the wing – when the tension on the B-riser on one side increases, pull down on that side to turn slightly towards the lifting air.

**WARNING: B-riser control should not be used in strong turbulence. In this case, release the speed bar and fly the glider actively with the brakes.**

**Use small inputs during B-riser control to reduce the risk of stalling the wing.**

## 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.

All rapid descent methods should 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 different manoeuvres which increase the sink rate in a safe and controllable manner.

B3 descent and spiral dives are generally the most common methods of descent for competition wings. B3 descent 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.

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.

### Spiral dives

The spiral dive is the most effective 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 Leopard 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.**
- **Frequent steep spirals may cause premature aging of your wing.**
- **Spirals with descent rates above 10 m/s are not recommended.**

**WARNING: 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.**

### **G-chute**

The “G-chute” safety device is a small “Anti-G”-type drag parachute that reduces the high G forces which may occur during the descent in a spiral dive. This enables the pilot to achieve a higher rate of descent with fewer turns and allows safer spiral descents by reducing G forces in a spiral dive.

The G-chute is simple and easy to use and usually connected to a carabiner on the harness. It is deployed before the spiral and pulled back after the manoeuvre is finished and stowed away in the harness.

The Genie Race harness, specially developed for XC and competition flights, has an additional pocket and bridle connecting for the use of the G-chute.

### **B3-Descent**

To increase your sink rate, first apply a little speed bar (about 25%) and then pull in the (outer) B3 lines simultaneously, firmly and progressively. To exit the manoeuvre, release the tips simultaneously and progressively and then release the speedbar.

### **Big ears**

It is not recommended to do big ears on the Leopard. The manoeuvre is technically possible, but it takes great arm strength to hold in the ears and the glider loses structure when the ears are in. Furthermore, the thin Aramid lines can damage the fabric.

### **B-Stall**

This manoeuvre is not possible with the Leopard. For fast descent use a steep spiral or B3-Descent as described above.

## **Landing**

The Leopard requires no specific techniques for landing. Land on a large and obstacle-free landing site. Observe the wind direction and strength, and any hazards in, or near, the landing area.

Fly a proper landing circuit and plan your final approach well in advance. Never perform steep turns near the ground. This may cause the pilot to pendulum dangerously.

Actively choose a spot on the ground in the landing field to aim for. Adopt an upright position in your harness by sliding your legs forward, ready to make contact with the ground.

Make your final approach as straight as possible. Fly at around trim speed (keep just enough tension on the brakes to keep contact with the wing, a little more tension in turbulent air). Once you come within a metre of the ground, brake progressively to maintain a level flight path.

In nil or light winds, flare positively to reduce your ground speed to a minimum. Again: higher wing loading results in a higher ground speed. Make sure you always land into the

wind. In nil wind situations, be prepared to run fast. In stronger winds, use only the minimum amount of flare necessary to sufficiently minimize your vertical and horizontal speed. If you flare too hard in strong winds, the glider will climb rapidly upwards and backwards, and you may get injured.

In strong winds, turn to face your wing as soon as your feet touch the ground. Immediately stall the glider as rapidly as possible with the brakes or rear risers. Be prepared to run towards your wing.

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

**WARNING: Although the Leopard 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 ageing process of your wing.**

## Range of use

The Leopard 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.

### Towing

The Leopard is suitable for towing and the procedure for a towing is similar in its initial stages to a forwards launch. 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.

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 Leopard 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.

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 check regularly 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).**

**WARNING: 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.**

### Paramotoring

The Leopard is not intended for paramotoring. Details of GIN wings suitable for motorized flight can be found in the paramotoring section of our website (see appendix).

**Tandem paragliding**

The Leopard is not intended for tandem paragliding.

**Aerobatics**

Your Leopard was not developed or tested to be used for aerobatics (acro). By engaging in such an activity, you voluntarily assume an increased risk of injury or death.

Any type of acrobatic manoeuvre at all on the Leopard is contrary to law and illegal. The pilot would be putting his/her life at risk. Aerobatics involves a risk of unpredictable flight attitudes, which could lead to damage to material and structural failure.



# 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

The Leopard is optimised for XC and competition paragliding and is intended only for professional pilots who are able to demonstrate above-average experience and competence in safety training. The Leopard is under no circumstances suitable for a pilot's first experience with safety training.

Special folding lines were used for certification of the Leopard (see the section "Folding lines"). Without these folding lines, asymmetric collapses and front stalls vary from the EN guidelines.

### 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 Leopard, 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 Leopard, 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 this line down completely until it becomes tight and the cravat normally comes out.

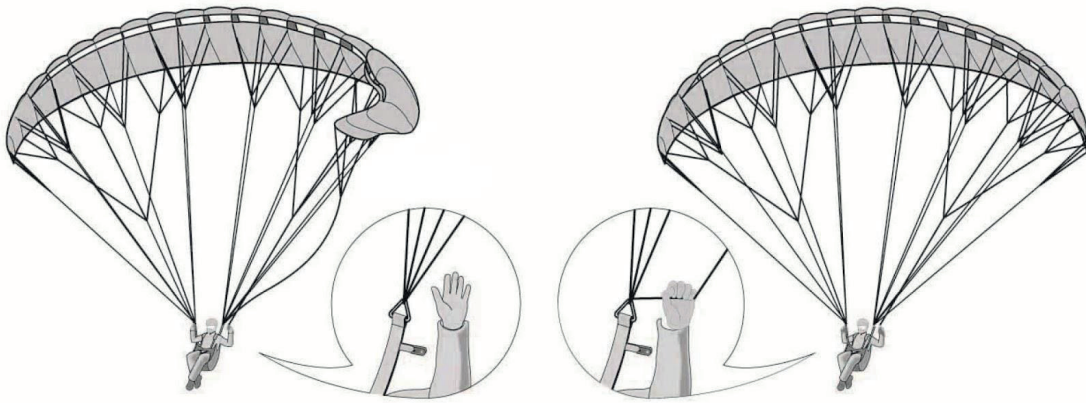


Figure: Grabbing the stabilizer/winglet main line

**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 Leopard 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.

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 Leopard 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 Leopard. 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.

### **Temperature range**

Temperatures under  $-10^{\circ}\text{C}$  and over  $+50^{\circ}\text{C}$  can make the paraglider unfit to fly. The manufacturer's warranty will lapse if the glider is used outside of this temperature range.

# Storing, care, maintenance and repairs

## Storing the paraglider

### Packing the paraglider

The Leopard 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 Leopard 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.

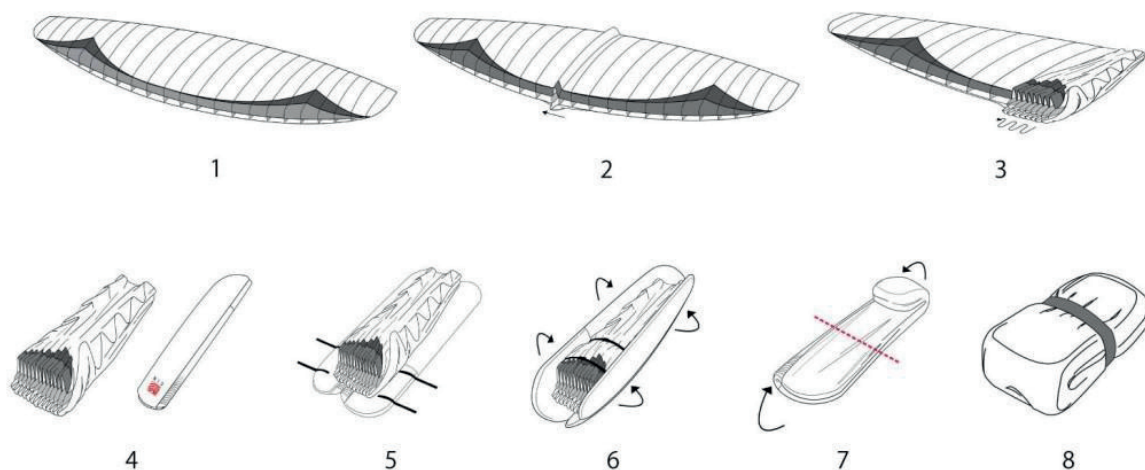


Figure: Packing the Leopard

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

All GIN gliders are delivered with a suitable and durable rucksack, which is easy to pack and offers good ergonomics and comfort.

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 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.

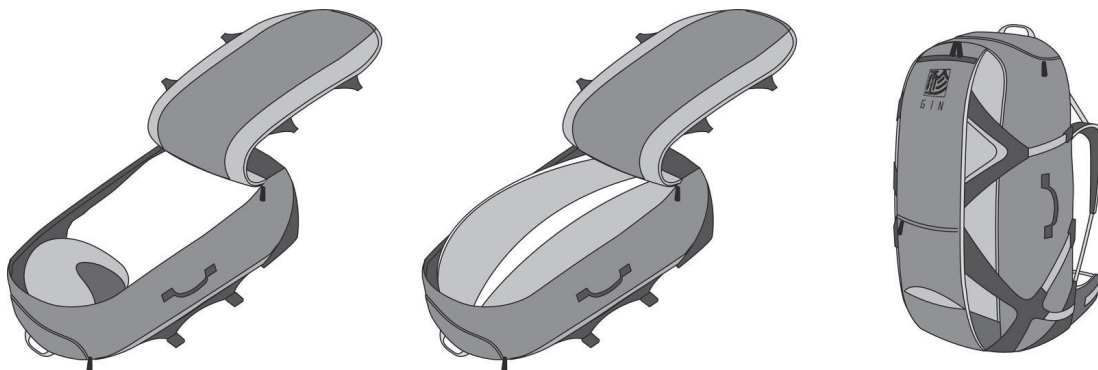


Figure: Packing the rucksack

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

The plastic rods on the Leopard 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.

### **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 must be measured with a load of 5kg, in order to ensure reproducible results for a comparison with the lengths in the check sheets.

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

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 trim check should be performed during the first 12 months by an authorized GIN agent.

A qualified professional should perform a formal maintenance inspection no later than 12 months or after 100 hours (including ground handling), whichever is sooner. Subsequent inspections should be made annually or after 100 hours.

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 ground handle frequently or fly in harsh conditions, we recommend a bi-annual check. It is your responsibility as a pilot to ensure that your wing is airworthy at all times.

We recommend replacing the line set at least every 150 hours.

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.

Service and repair shops authorized by Gin gliders are in possession of the Gin Gliders service instruction, which contains all the necessary procedures, equipment and additional technical information about the Leopard, 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.

## Inspection by the pilot

Under § 14 para. 5 of the German Aeronautical Products Investigation Order (LuftGerPV), pilots in Germany 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.

The DHV 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 Leopard, 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

The German Hanggliding and Paragliding Association (DHV) and its safety division have developed guidelines which are based on many years of analysing paraglider accidents and on the experience of flying schools, flying instructors and safety officers. These guidelines should help pilots to select the appropriate glider classification for their particular level of flying ability. The information below relates to the classification in EN/LTF- certification. There is also further information on the website of the relevant licensing body.

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

#### EN/LTF certification

The Leopard received EN-D classification in the final classification by the licensing body.

#### Description of flight characteristics

Paragliders with demanding flying characteristics and potentially violent reactions to turbulence and pilot errors. Recovery to normal flight requires precise pilot input.

#### Suitability for training

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

#### Description of pilot skills required

##### Target group and recommended flying experience

The Leopard is designed from the outset as a competition glider, and is one of the highest performing paragliders from Gin Gliders. It is suitable for the very experienced pilot who also flies frequently (at least 75-100 hours airtime per year), wants high performance, is aware of the risks associated with high performance gliders and has the skills to handle such wings and extreme flight manoeuvres for this class.

The Leopard is designed for pilots well-practised in recovery techniques, who fly very actively, have significant experience of flying in turbulent conditions, and who understand and accept the risks of flying such a wing.

**Normal flight requirements**

The performance optimized flight and control behaviour of paragliders of this class requires comprehensive flight experience and superior aeronautical knowledge.

**Requirements for incidents and quick descents**

The behaviour of the glider after deviations from normal flight demands a maximum of expertise and responsiveness of the pilot. The safe control of extreme flight behaviour after disturbances and demanding flight manoeuvres, such as fast descent, must be practised to the highest level through constant training. Even minor pilot errors must be eliminated.

**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

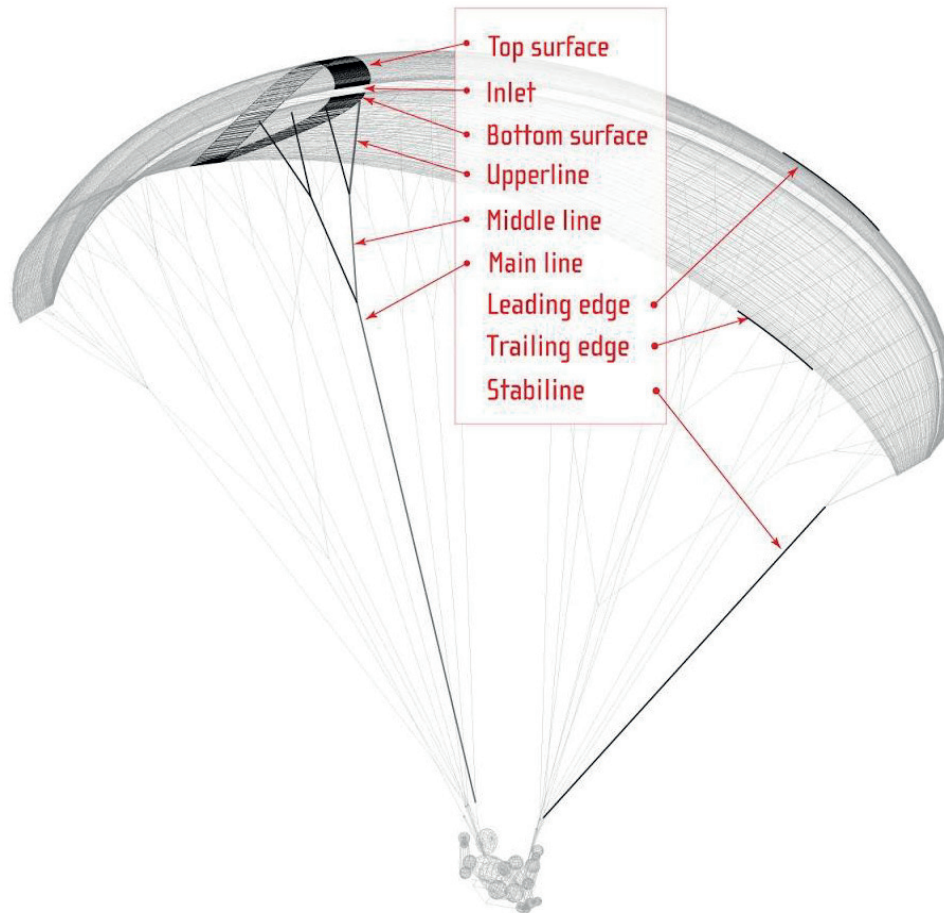


Figure: Overall Illustration

## Technical data

Size	XS	S	M	L
Area (flat) [m <sup>2</sup> ]	20.50	22.32	24.22	26.70
Area (projected) [m <sup>2</sup> ]	17.56	19.14	20.80	22.93
Span (flat) [m]	12.08	12.63	13.18	13.846
Span (projected) [m]	9.79	10.25	10.71	11.25
Aspect ratio (flat)				
CAD (simple)	7.12	7.15	7.17	7.17
CIVL (calculated)	6.86	6.90	6.93	6.93
Aspect ratio (projected)	5.45	5.50	5.51	5.51
Cells	86	86	86	86
Glider weight [kg]	4.85	5.30	5.65	5.95
Weight [kg]	70-88	85-102	95-112	105-127
EN/LTF	D	D	D	D

## Riser and speed system

### Riser

The specially developed riser for the Leopard allows the pilot to use a pulley system and B-bar to adjust the speed to suit individual preference.

The low friction ring which guides the main brake line is connected via the brake arm with a handshake-knot on the B-riser. The ring can easily be replaced in case of damage.

### Riser diagram

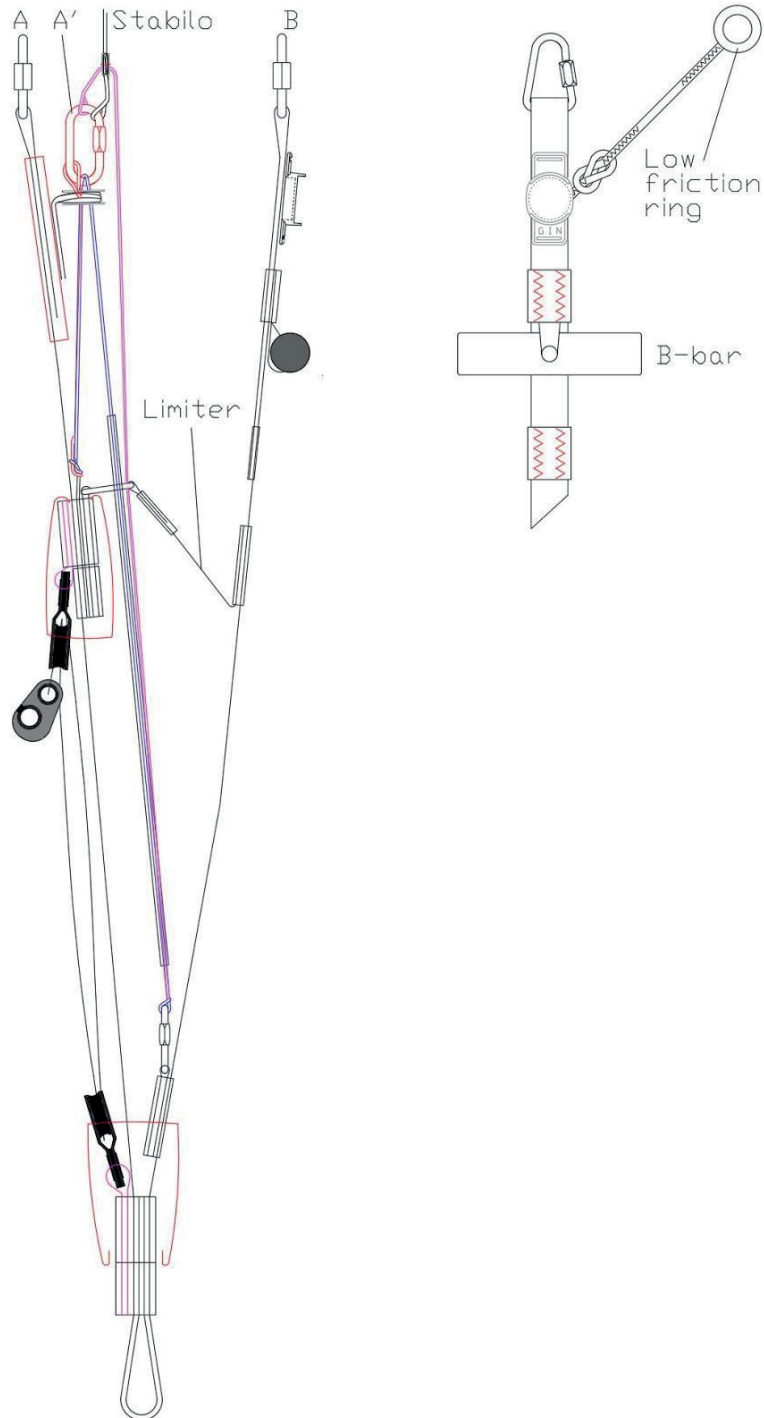


Figure: Leopard riser



## Riser lengths

Riser lengths [mm] *	A	A'	Stabilo	B
Trim speed XS	520	487	507	520
Full speed XS	395	405	460	520
Trim speed S, M, L	520	487	507	520
Full speed S, M, L	375	385	440	520

\* incl. carabiner (Maillions)

## Speed System

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

The speed system accelerates the wing by progressively shortening the risers towards the front. This decreases the canopy's original angle of attack and the speed of the glider increases.

The speed system must be correctly fitted and adjusted to ensure it operates smoothly during flight. Before first launch, the length should be adjusted to suit the pilot and the line duct should be checked.

The speed bar and the riser are connected by special Brummel hooks. Adjust the length to the speed system so that your legs are fully stretched when at maximum accelerated flight (A-B limiter under tension on the riser), otherwise you may experience symptoms of fatigue in long flights. You should still be in a comfortable flight position even when the speed system is used to its full extent.

You will not be able to use the full potential of your paraglider if the speed system is too long. Fasten the speed bar to the harness before launch to avoid tripping over it when preparing to launch or taking off.

Under FAI and PWCA rules the risers must include a limiter between the main A riser and the B riser, to prevent acceleration beyond the certified top speed of the glider. Many top pilots find that the optimum speed system setup is to rig the system so that the limiters are just tight when the legs are comfortably fully extended (knees locked) on the top bar of the speed system (if multiple steps are used). This maximizes comfort and ensures that the speedsystem is symmetrically applied. It also allows the pilot to keep the wing fully accelerated while using the B-risers to steer the wing and control pitch in turbulence.

**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 generally strongly recommended that you do not use the speed system in turbulent areas and when flying close to the ground, because of the increased risk of collapse.**

## Line system and brakes

### Line system

The Leopard has A and B 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" (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 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.**

### Folding lines

The Leopard was certified with the use of folding lines. Without these folding lines, asymmetric and symmetric collapses (tucks and frontals) don't behave or recover as per the EN tests.

At the canopy, the folding lines are attached to additional loops at the rear end of the air intake. At the lower end, the folding line riser is attached to the upper webbing of the accelerator pulley.

Folding lines are available as an optional extra and should be added to the wing before inducing collapses. The folding lines will come with an added-on instruction manual and an extra manual explaining how they should be installed properly. Please contact your Gin Gliders dealer or Gin Gliders direct if you have any questions regarding use of the folding lines.

### Brake line adjustment

#### Factory setting

The brake lines of the Leopard 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:

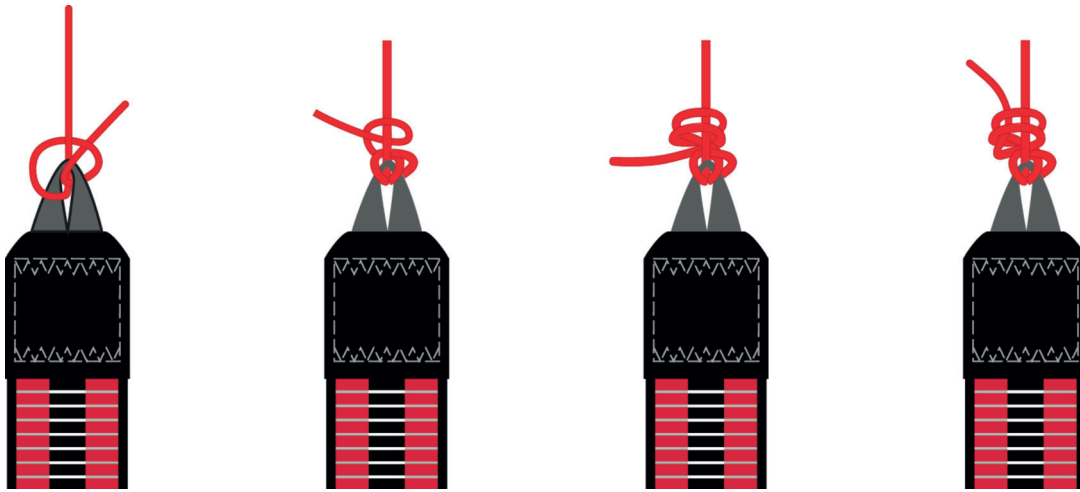


Figure: Brake line knot

**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.

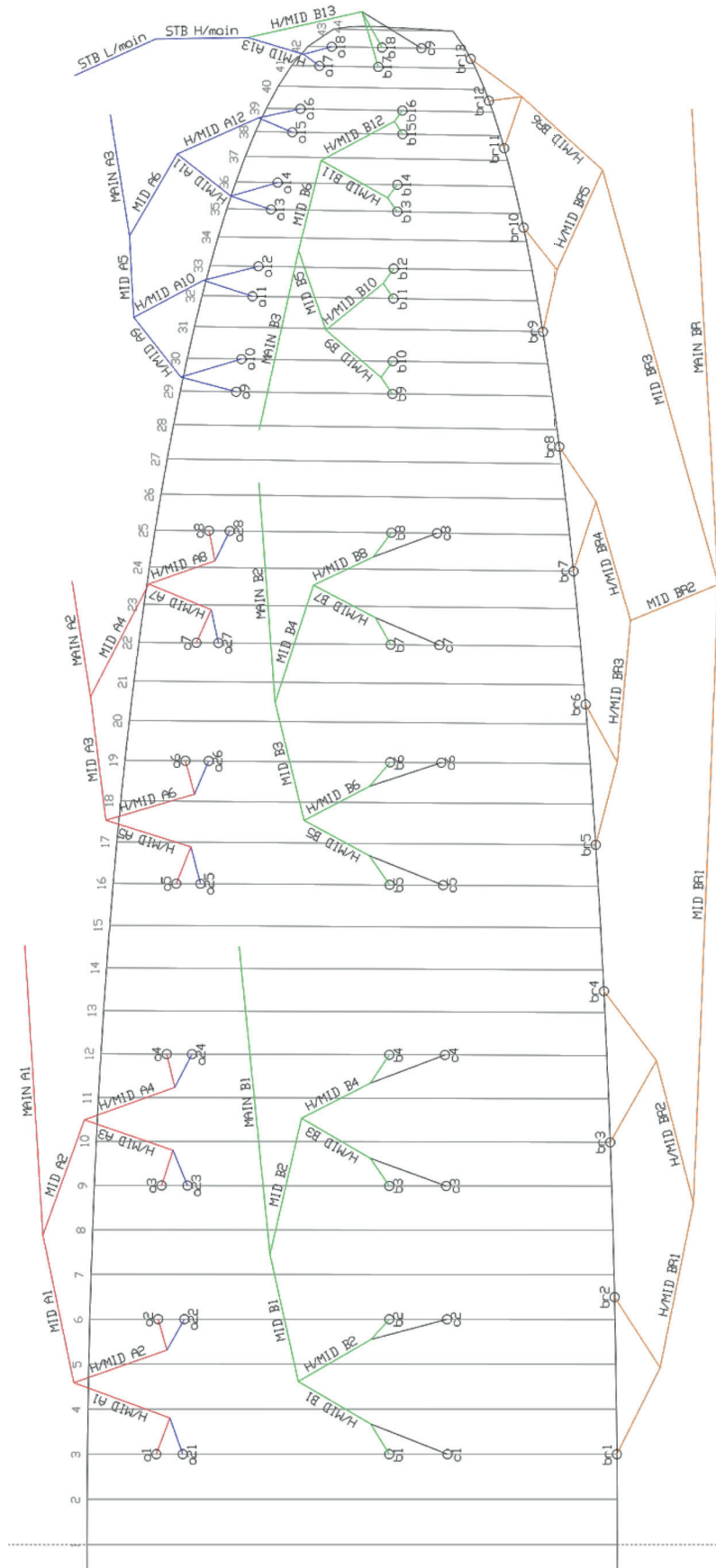
If the brakes are shortened, care must be taken that the paraglider is not slowed down in trim and accelerated flight. Safety issues may arise and performance and launch behaviour may deteriorate if the brake lines are shortened too much.

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 exhibits dangerous behaviour in extreme flying
- 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



## Materials

### Canopy fabric

---

Upper surface leading edge	Porcher Skytex 38 g/m <sup>2</sup>
Upper surface trailing edge	Porcher Skytex 32 g/m <sup>2</sup>
Lower surface leading edge	Porcher Skytex 27 g/m <sup>2</sup>
Lower surface trailing edge	Porcher Skytex 27 g/m <sup>2</sup>
Ribs	Porcher Skytex 32   40 g/m <sup>2</sup>

### Lines

---

Top	Edelrid 9200-030 / 8000/U-050   070   090
High Middle	Edelrid 9200-030 / 8000/U-050   070   090   130
Middle	Edelrid 8000/U-050   090   130   190
Main	Edelrid 8000/U-050   070   190   230   360
Main Brake	Gin Gliders TGL 180

### Riser

---

Cousin 12 mm Aramid & Dyneema

### Line shackle

---

Stainless steel 3.0 mm

### Canopy thread

---

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:	

**Inspections and repairs overview**

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

**Notes**

---

---

---

---

---

---

---

---

---

---

---

---

---

## 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)



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



GIN