

PIVIUK BEYOND
THE GLIDE



ROLLER 2

USER MANUAL

EN 926-1

ROLLER 2

FLY WITHOUT LIMITS

WELCOME

We welcome you to our team and thank you for the trust you have placed in our Niviuk paraglider.

We would like you to share the enthusiasm with which we have created this paraglider and the importance and care with which we have developed the design and manufacture of this new model. All this, in order to be able to offer you the maximum pleasure in every flight under a Niviuk paraglider.

With the ROLLER 2, you can remove the "limits" of your imagination. The new model of our miniwing will break all your previous conceptions. It is synonymous with speed, precision and manoeuvrability, all in an accessible and surprisingly versatile wing.

The ROLLER 2 will allow you to take speed-flying to another dimension, as it is the biggest advance in this category, while maintaining safety above all else.

We are sure you will enjoy flying this paraglider and you will soon discover the meaning of our philosophy:

"Give importance to the small details to make big things happen".

This is the user manual and we recommend you read it carefully.

Niviuk Gliders & Air Games SL

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SPEED WINGS



USER MANUAL

This manual provides the necessary information on the main characteristics of your new paraglider.

Whilst it provides information, it cannot be viewed as an instructional handbook and does not offer the training required to fly this type of paraglider.

Training can only be undertaken at a certified paragliding school and each country has its own system of licensing.

Only the aeronautical authorities of respective countries can determine pilot competence.

The information in this manual is for information purposes only and is provided in order to warn you against adverse flying situations and potential dangers.

Equally, we would like to remind you that it is important to carefully read all the contents of your new ROLLER 2 manual.

Misuse of this equipment could lead to severe or irreversible injuries to the pilot, even death. The manufacturers and dealers cannot be held responsible for misuse of the equipment. It is the responsibility of the pilot to ensure the equipment is used correctly.



CONTENTS

| | |
|--|-----------|
| 1. CHARACTERISTICS | 4 |
| 1.1 WHO IS IT DESIGNED FOR? | 4 |
| 1.2 CERTIFICATION | 4 |
| 1.3 IN-FLIGHT BEHAVIOR | 4 |
| 1.4 TECHNOLOGIES, CONSTRUCTION, MATERIALS | 5 |
| 1.5 ELEMENTS, COMPONENTS | 6 |
| 2. UNPACKING AND ASSEMBLY | 6 |
| 2.1 CHOOSING THE RIGHT LOCATION | 6 |
| 2.2 PROCEDURE | 6 |
| 2.3 CONNECTING THE HARNESS | 6 |
| 2.4 HARNESS TYPE | 6 |
| 2.5 SPEED-BAR | 7 |
| 2.5.1 SPEED SYSTEM ASSEMBLY | 7 |
| 2.5.2 CHANGING THE RISER CORDS | 7 |
| 2.6 INSPECTION AND WING INFLATION ON THE GROUND | 7 |
| 2.7 ADJUSTING THE BRAKES | 7 |
| 2.8 ADJUSTING THE TRIMMERS | 8 |
| 3. THE FIRST FLIGHT | 8 |
| 3.1 CHOOSING THE RIGHT LOCATION | 8 |
| 3.2 PREPARATION | 8 |
| 3.3 FLIGHT PLAN | 8 |
| 3.4 PRE-FLIGHT CHECK | 8 |
| 3.5 WING INFLATION, CONTROL AND TAKEOFF | 8 |
| 3.6 LANDING | 9 |
| 3.7 PACKING | 9 |
| 4. IN FLIGHT | 9 |
| 4.1 FLYING IN TURBULENCE | 9 |
| 4.2 POSSIBLE CONFIGURATIONS | 10 |
| 4.3 ACCELERATED FLIGHT | 11 |
| 4.4 FLYING WITHOUT BRAKE LINES | 11 |
| 4.5 LINE KNOT(S) IN FLIGHT | 11 |
| 5. LOSING ALTITUDE | 12 |
| 5.1 BIG EARS | 12 |
| 5.2 B-LINE STALL | 12 |
| 5.3 SPIRAL DIVE | 12 |
| 5.4 SLOW DESCENT TECHNIQUE | 12 |
| 6. SPECIAL METHODS | 13 |
| 6.1 TOWING | 13 |
| 6.2 ACROBATIC FLIGHT | 13 |
| 7. CARE AND MAINTENANCE | 13 |
| 7.1 MAINTENANCE | 13 |
| 7.2 STORAGE | 13 |
| 7.3 CHECKS AND INSPECTIONS | 14 |
| 7.4 REPAIRS | 14 |
| 8. SAFETY AND RESPONSIBILITY | 15 |
| 9. GARANTEE | 15 |
| 10. ANNEXES | 16 |
| 10.1 TECHNICAL SPECIFICATIONS | 16 |
| 10.2 MATERIALS TECHNICAL DATA | 17 |
| 10.3 LINE PLAN | 18 |
| 10.4 RISER PLAN | 19 |
| 10.5 LINE MEASUREMENTS ROLLER 2 14 | 20 |
| 10.6 LINE MEASUREMENTS ROLLER 2 16 | 21 |
| 10.7 LINE MEASUREMENTS ROLLER 2 18 | 21 |
| 10.8 LINE MEASUREMENTS ROLLER 2 20 | 21 |
| 10.9 CERTIFICATION | 22 |

1. CHARACTERISTICS

1.1 TARGET GROUP

The ROLLER 2 is a miniwing with a very wide speed range. Specially designed for speed-flying, it is stable, light, manoeuvrable and can be flown quickly and precisely at all times. The ROLLER 2 is the perfect balance between speed, agility, design and high performance.

It is a very versatile model: a glider with which the pilot is not only limited to fast downhill flights, but can also have fun in thermals, soaring, carving or flying in strong winds of up to 70 km/h.

It is important to note that prior training is essential when beginning speed-flying. In terms of safety, it is paramount that the pilot's skill level matches the "performance" of the glider and/or the objectives of the pilot. The control, safety and freedom provided by the ROLLER 2 depend directly on the pilot's level of skill and experience.

This wing is intended for licenced and experienced pilots. And depending on the size and wing-loading, it should only be flown by expert pilots.

The ROLLER 2 is NOT intended for new or beginner pilots.

We recommend that beginners take advice from professionals in the sector during their post-training apprenticeship.

We recommend pilots coming from other free flying disciplines to use the advice of professionals and their common sense to adapt their experience to speed-flying.

The ROLLER 2 is a wing specifically designed for a wide range of pilots to enjoy the experience of speed.

1.2 CERTIFICATION

The ROLLER 2 has been submitted for the European EN and LTF certification.

All certification tests were performed at the Swiss testing house Air Turquoise.

All sizes passed the load, shock and flight tests.

The load test proved that the wing can withstand the stipulated 8 G.

The shock test proved that the wing can resist 800 daN of force.

The flight test resulted in the following certification of the ROLLER 2 for all sizes (14, 16, 18 and 20):

EN 926-1
LTF

We recommend that only pilots who are familiar with gliders of this certification or above fly this paraglider.

Only the aeronautical authorities of respective countries can determine pilot competence.

We recommend pilots read the flight test report carefully, especially the comments of the test pilot.

The report contains all the necessary information on how the paraglider reacts during each of the tested manoeuvres.

It is important to note that different size wings will react differently during manoeuvres. Even within the same size, at maximum or minimum load, the behaviour and reactions of the wing may vary.

For further information on the flight test and the corresponding certification, please see the final pages of this manual or see or visit the Downloads section at <https://niviuk.com/en/downloads>

1.3 IN-FLIGHT BEHAVIOUR

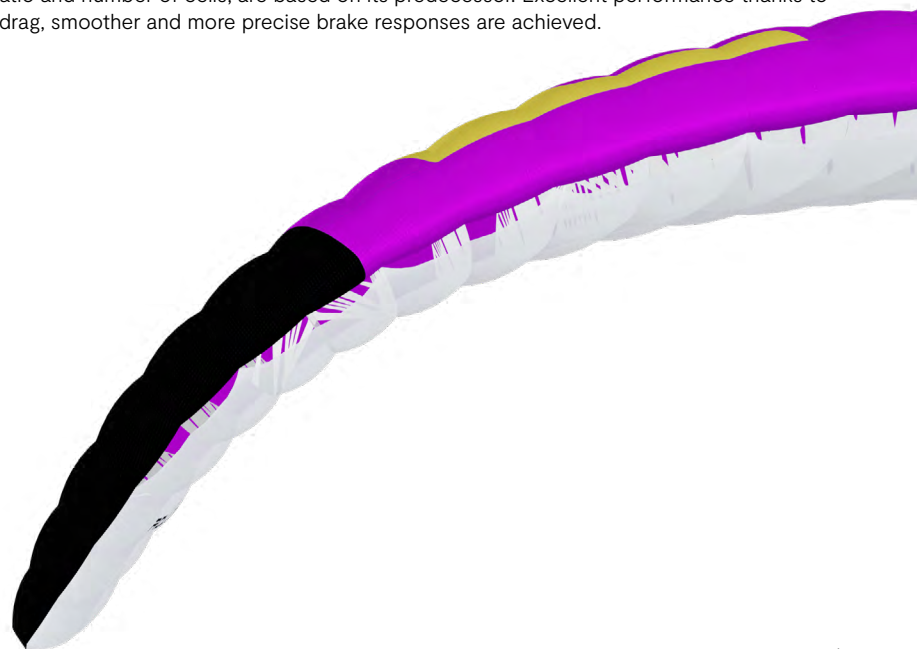
Niviuk developed this wing by adopting very specific goals: to offer the best possible features, excellent handling, to make flying easier for the pilot.

Our other aims were to achieve optimal performance while maintaining the highest level of safety. To ensure that the wing transmits the maximum feedback in an understandable and comfortable way so that the pilot can focus on piloting and enjoying the flight. And, with active piloting, take advantage of all favourable conditions.

Agile and easy to fly: due to its weight (3 kg in size 14) and its reduced aspect ratio, the ROLLER 2 is a very agile and energetic glider that offers endless possibilities. With dynamic handling and responsive manoeuvrability, control is assured. It is fast and safe in turns.

Excellent performance: it features a wide speed range thanks to trimmers and speed-bar. It has no speed limitations, as it features a high-performance profile with very low aerodynamic drag. It remains compact at all times, especially at high speeds.

Safe manoeuvres: with total passive safety, the ROLLER 2 is very stable. Some of its technical specifications, such as the aspect ratio and number of cells, are based on its predecessor. Excellent performance thanks to low inertia and little drag, smoother and more precise brake responses are achieved.



Stable and responsive: reaction and precision in flat turns, with a feeling of total control in the turn. Very stable across the entire speed range. Handling is direct, precise and intuitive in flight – it is an easy glider to predict and control.

Launch and landing: easy and steady inflation, it allows for a comfortable take off. Landings are smooth and controlled thanks to perfect speed retention.



PLEASE NOTE

The term “speed-flying” implies that, in addition to having the necessary experience and qualifications to fly this type of glider, the pilot must also fly actively and vigilantly. It is crucial to pay attention to speed during turns, abrupt manoeuvres and in general during all acceleration, especially when flying close to the ground and/or obstacles. The pilot must be precise and quick in their responses, whether using the brakes or weight-shifting, which requires considerable adaptation to fully enjoy this activity.

1.4 TECHNOLOGIES, CONSTRUCTION, MATERIALS

The ROLLER 2 benefits from all the construction and assembly techniques used in our factory. It has all the current technology and accessories available to improve pilot comfort whilst increasing safety and performance.

In the design of all Niviuk products the team aims to ensure development and continuous improvement. The technologies developed in recent years have allowed us to develop greater, better wings. It is in this context that we would like to introduce the technologies included in this new model:

RAM Air Intake – the system is characterised by the arrangement of the air inlets, to ensure optimal maintenance of internal pressure across the the whole range of angles of attack.

The result? Having greater internal pressure means better tolerance of turbulence, greater consistency of the profile shape across the speed range; excellent handling at low speed is achieved by allowing the pilot to extend the braking limit, there is a lower risk of collapse and consequently, greater control and safety.

Titanium Technology (TNT) – a revolutionary technique using titanium. Using Nitinol in the internal construction provides a more uniform profile and reduces the weight to gain efficiency in flight. Nitinol provides the highest level of protection against deformation, heat or breaks.

Nitinol now features in all our wings.

Structured Leading Edge (SLE) – the application of Nitinol rods in the leading edge. This technology provides increased strength and stability by maintaining the shape of the aerofoil throughout all phases of flight. This increases performance, efficiency and stability, absorbs turbulence better and makes the wing much more durable over time.

3D Pattern Cut Optimisation (3DP) – this involves placing the fabric of each panel in one direction only, taking as a reference its location on the leading edge. It has been proved that, if the cloth pattern is correctly aligned to the direction of the load axes, the material deforms much less flight after flight, so the leading edge keeps its shape better and is much more durable over time.

Over the years, the design of our paragliding and paramotoring wings has evolved a lot, with a positive and specific advancement of the leading edge.



3D Leading Edge (3DL) – this means adjusting the material of the leading edge to avoid ballooning and the creases that form in this curved area of the wing. Specifically, the leading edge is divided into “sub-panels” sewn into each of the cells at the front of the glider. As a result, the tension of the leading edge cloth is perfectly uniform, increasing the performance and durability of the glider.

The use of these technologies is a big technological leap forward in building wings and a big improvement in flight comfort.

For the construction process of the ROLLER 2 we use the same criteria, quality controls and manufacturing processes as in the rest of our range. From Olivier Nef’s computer to fabric cutting, the operation does not allow for even a millimetre of error. The cutting of each wing component is performed by a rigorous, extremely meticulous, automated computer laser-cutting robotic arm. This program also paints the guideline markers and numbers on each individual fabric piece, thus avoiding errors during this delicate process.

The jigsaw puzzle assembly is made easier using this method and optimises the operation while making the quality control more efficient. All Niviuk gliders go through an extremely thorough and detailed final inspection. The canopy is cut and assembled under strict quality control conditions facilitated by the automation of this process.

Every wing is individually checked with a final visual inspection.

The same fabric has been used as in the rest of the range, ensuring its guaranteed lightness, strength and durability without loss of colour.

The main lines are made from Technora with a polyester sheath, the lower gallery lines are made from sheathed Dyneema and the upper gallery lines are made from unsheathed Dyneema.

The diameter is adjusted according to the load, aiming for the best performance with the least drag. The sheath protects the core from UV rays and abrasions.

The lines are produced semi-automatically and all seams are finished under the supervision of our specialists.

After final assembly on the canopy, the lineset is measured on each individual wing.

Each glider is packed following specific maintenance instructions as recommended by the fabric manufacturer.

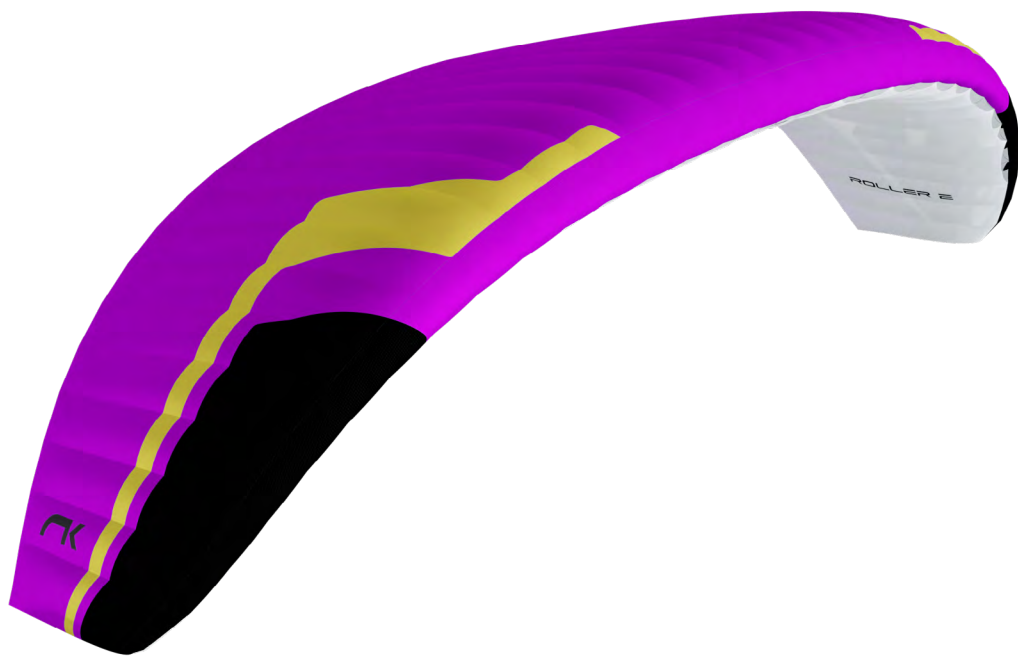
Niviuk gliders are made of premium materials that meet the requirements of performance, durability and certification that the current market demands.

Information about the various materials used to manufacture the wing can be viewed in the final pages of this manual.

1.5 ELEMENTS, COMPONENTS

The ROLLER 2 is delivered with a series of accessories that will greatly assist you in the maintenance of your paraglider:

- The inner bag, to keep the glider protected during storage and transport.
- An adjustable compression strap, which allows the inner bag to be compressed as much as possible to reduce packing volume.
- A riser bag, to protect them and pack them neatly.
- A repair kit with self-adhesive Ripstop tape.
- The Kargo 45 backpack: this is not included in the scope of delivery, but its purchase is recommended. It is perfect for transporting all the equipment comfortably and with plenty of space.



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2. UNPACKING AND ASSEMBLY

2.1 CHOOSING THE RIGHT LOCATION

We recommend unpacking and assembling the wing on a training hill or a flat clear area without too much wind and free of obstacles. It will help you to carry out all the recommended steps required to check and inflate the ROLLER 2.

We recommend the whole installation procedure is supervised by a qualified professional instructor or official dealer. Only they can address any doubts in a safe and professional way.

2.2 PROCEDURE

Take the paraglider out of the rucksack, open and unfold it on the ground with the lines positioned on the undersurface, oriented in the direction of inflation. Check the condition of the fabric and the lines for defects. Check the maillons/IKS connecting the lines to the risers to make sure they are fully closed and tightened. Identify, and if necessary, untangle, the A and B-lines, the brake lines and corresponding risers. Make sure that there are no knots. Identify, and if necessary, untangle, the A, B and C-lines, the brake lines and corresponding risers. Make sure that there are no knots.

2.3 CONNECTING THE HARNESS

The ROLLER 2 risers are colour-coded.

- Right: green
- Left: red

This colour-coding makes it easier to connect the wing to the correct side and helps prevent pre-flight errors.

Correctly connect the risers to the attachment points so that the risers and lines are correctly ordered and free of twists. Check that the IKS or carabiners are properly fastened and securely locked.

2.4 HARNESS TYPE

In order to get the most out of your ROLLER 2, it is essential to choose the right harness. The ROLLER 2 can be flown with virtually all current harnesses, however, we recommend a lightweight harness with split leg loops.

At Niviuk we have designed a harness that adapts perfectly to these needs. The ROAMER 2 is a large capacity reversible harness, comfortable, with split leg loops, with excellent balance and response both for wing control and for transmitting feedback to the pilot. Without doubt it is the perfect partner for the ROLLER 2.

Harnesses with back protectors, whether airbag or foam, are compatible with the ROLLER 2. If the harness used has an adjustable chest strap, we recommend adjusting it to the distance recommended during the certification, which varies according to size. See the certification report.

Care should be taken with the chest strap setting, as the distance of the chest strap setting will affect the handling of the glider. If the chest strap is too wide, it allows greater feedback but this carries the risk of

affecting the stability of the wing. If the chest strap is set too tightly, the wing feels more solid, but there is a loss of feedback and a risk of twisting in the case of a violent asymmetric collapse.



PLEASE NOTE

When choosing a speed-flying harness, you should look beyond control and comfort during flight. At all stages of the flight you will have to make quick decisions. The body posture must not be hindered by elements of the harness that impede movement or piloting.

2.5 SPEED-BAR

The speed-bar is a means of temporary acceleration by changing the flow over the profile. The speed system comes pre-installed on the risers and is not modifiable as it conforms to the measurements and limits stipulated in its certification.

The ROLLER 2 comes with a 9 cm speed system as standard. The speed system is operated by pushing with the feet on the speed-bar (not supplied as standard on this model) which the pilot must install by connecting it to the speed system on the risers (See 2.5.1: "Speed system assembly").

The speed system uses an action/reaction system. Released, the speed-bar is set to neutral. When the bar is pushed using the feet, the wing accelerates. The speed can be regulated by varying the pressure on the bar. Once the pressure on the bar is released, the speed system returns to the neutral setting.

The speed system is efficient, sensitive and precise. The pilot can use the system whenever they want during the flight. In the neutral position the glider will fly at the standard speed and glide. Using full speed-bar, the wing will fly at maximum speed, but the glide will be adversely affected.

- Released speed-bar: the A, B and C-risers are aligned.
- Full speed-bar: the difference between A and B risers is 3 cm; and between A and C risers is 9 cm.



PLEASE NOTE

The use of the speed system results in changes to the speed and reactions of the wing. For more information, please see the certification report.

2.5.1 SPEED SYSTEM ASSEMBLY

By speed system we mean the speed-bar that the pilot pushes to accelerate, together with the two lines that connect it to the cords on the risers. Once you have decided on the type of speed-bar you wish to use, it is necessary to proceed with its installation. Something to consider:

- The pilot can use the type of speed-bar they consider appropriate depending on the type of harness used and their preferences.
- This configuration is detachable to facilitate its connection and/or disconnection to the risers and its respective adjustment.
- For installation through the harness, the harness manufacturer's instructions must be followed. Most harnesses are already pre-fitted for this purpose.
- The standard connection is made by means of the Brummel hooks in which the two grooves slide into each other to interlock, ensuring their use and connection/disconnection. However, any safe splicing system can be used.

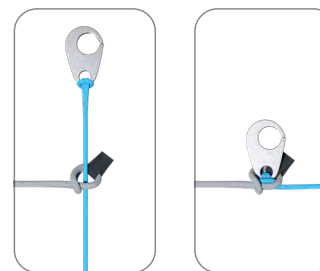


Diagram 1. Speed-bar connection by means of the Brummel hook passage

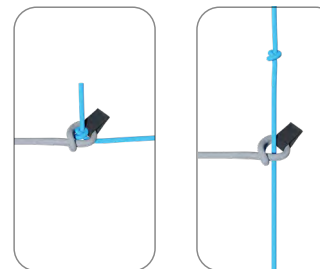


Diagram 2. Speed-bar connection by means of Kite loop (without Brummel hook)

2.5.2 CHANGING THE RISER CORDS

In spite of the speed system having pulleys with bearings to reduce friction to a minimum, the frequency with which the speed-bar is used causes the cord to wear and you may need to replace them.

In all Niviuk gliders the speed system cords on the risers are completely removable and easily replaceable. You can use the Brummel hooks, not use them, remove them, use another type of connector, etc. It is even possible to fix the speed-bar cords directly to the speed system on the risers. This last option makes the connection / disconnection more laborious, but means the cord has maximum travel without obstructions or restrictions which is very useful for some models of harnesses.

2.6 INSPECTION AND WING INFLATION ON THE GROUND

After your gear has been thoroughly checked and the weather conditions deemed favourable for flying, inflate your ROLLER 2 as many times as necessary to familiarise yourself with its behaviour. Inflating the ROLLER 2 is easy and should not require a great deal of physical effort. Inflate the wing with a little pressure from the body using the harness. This may be assisted by using the A-lines. Do not pull on them; just accompany the natural rising movement of the wing. Once the wing is inflated to the overhead position, appropriate control with the brakes will be sufficient to hold it there.

2.7 ADJUSTING THE BRAKES

The length of the main brake lines are adjusted at the factory and conform to the length stipulated during certification. However, they can be changed to suit your flying style. It is advisable to fly with the original setting for a period of time to get used to the actual behaviour of the ROLLER 2. In case it is necessary to modify the brake length, loosen the knot, slide the line through the brake handle to the desired point and re-tighten the knot firmly. Only qualified personnel should carry out this adjustment. You must ensure that the

modification does not affect the trailing edge and slow the glider down without pilot input. Both brake lines should be symmetrical and the same length. We recommend using a clove hitch or bowline knot.

When changing the brake length, it is necessary to check that they do not engage when the speed-bar and the trimmers are used. When we accelerate, the glider rotates over the C-riser and the trailing edge elevates. It is important to check that the brake is adjusted to take into consideration this extra distance during acceleration. With this profile deformation there is a risk of generating turbulence and causing a frontal or asymmetric collapse.

2.8 ADJUSTING THE TRIMMERS

The trimmers are already fitted as standard and only need to be checked for correct operation and adjustment.

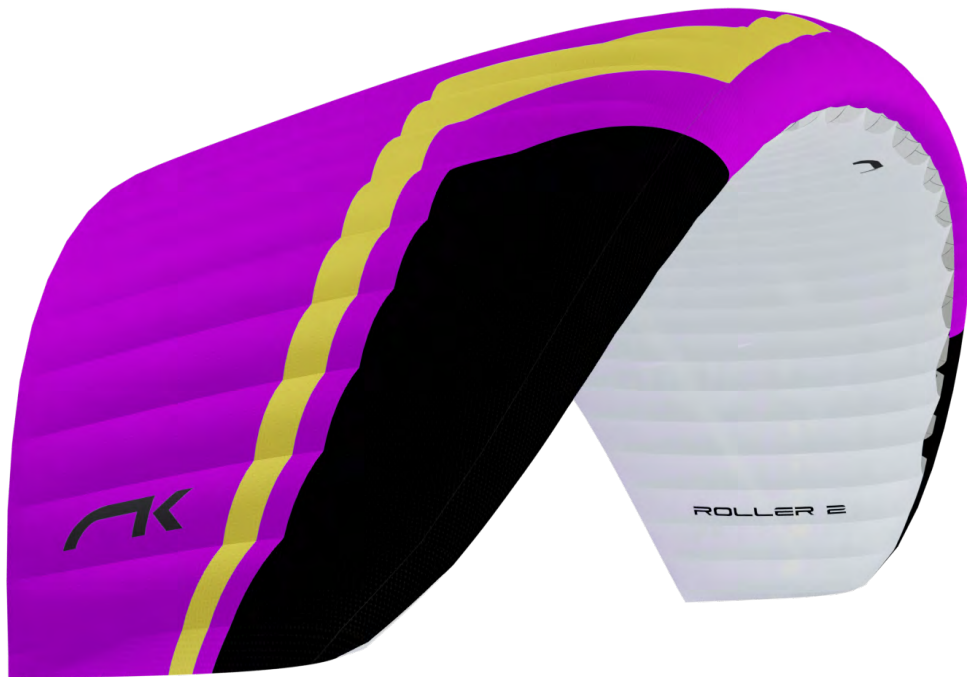
The ROLLER 2 risers are divided into 3 branches. The trimmers are located on the C-risers and are adjustable with a total travel of 10 cm.

Adjusting the trimmers causes changes in the speed and reactions of the wing.

It is the pilot's responsibility to ensure that the trimmer setting is appropriate. The trimmer setting and symmetry must be constantly checked during the flight and, above all, before each take off.

The trimmer system is set by the pilot, i.e. it does not return to its point of origin.

Opening and closing the trimmers is efficient and fast, as well as sensitive and precise.



Put simply, if the trimmers are in the neutral position, there is less speed and more glide; and with the trimmers are open, there is more speed and less glide.

Trimmers in neutral position: the A, B and C-risers are aligned.

Trimmers open: the difference between A and B risers is 3.3 cm; and between A and C risers is 10 cm.

3. THE FIRST FLIGHT

3.1 CHOOSING THE RIGHT LOCATION

For the first flight we recommend going to your usual flying area and that a qualified instructor is present and supervising the entire procedure.

On arrival at take-off, the pilot must assess the conditions: wind speed and direction, possible rotor areas, clean launch site, etc.

It is necessary to formulate a flight plan which takes in the topography of the terrain and to avoid possible obstacles or risk areas. Choose a large take-off area without any obstacles.

When unpacking the wing, examine it, the harness, helmet and any other items of equipment.

3.2 PREPARATION

Repeat the procedures detailed in section 2 UNPACKING AND ASSEMBLY to prepare your equipment.

3.3 FLIGHT PLAN

It is necessary to make a flight plan in advance, to avoid possible errors in decision making.

3.4 PRE-FLIGHT CHECK

Once ready, but before taking off, conduct another equipment inspection. Conduct a thorough visual check of your gear with the wing fully open, the lines untangled and properly laid out on the ground to ensure that all is in working order. Be certain the weather conditions are suited to your flying skill level.

3.5 WING INFLATION, CONTROL AND TAKEOFF

The launch phases with the ROLLER 2 are the same as with conventional gliders. With a normal wind speed and once all equipment is checked and ready to fly, the position of the trimmers should be adjusted to the neutral position. Miniwings take off much faster than standard paragliders, so more running space will be needed.

A slight tug on the risers will ensure a clean inflation. If you must make a correction, do so once the acceleration phase has started - it is better to let the wing have pressure, and then act, as it will usually settle back into place by itself. It is important to take off at speed and remember that any input on the brake reduces speed.

With time, having gained experience and knowing the wind intensity better, it will be possible to tailor the launch to your preferences. We recommend that whenever possible, taking off into a headwind. In this way, a visual inspection can be carried out with more guarantees of success.



PLEASE NOTE

Given the wide range of possibilities and conditions in which the ROLLER 2 can fly, it is essential to adapt the launch to the circumstances and conditions in which each flight takes place. Conditions must be correctly assessed, and be suitable for the pilot's experience and flying skills. The ROLLER 2 is a fast wing, so it is important not to underestimate the conditions and go beyond the pilot's capabilities.

3.6 LANDING

The ROLLER 2 lands excellently, it converts the wing speed into lift at your demand, allowing an enormous margin of error. Wrapping the brake lines around your hand to get greater braking efficiency is not necessary.

It is important to remember the steps for landing: trimmers should be in the neutral position, make your approach glide straight and with speed, have smooth control when rounding out and just as the speed slows down, brake to the maximum.

3.7 PACKING

The ROLLER 2 has a complex leading edge, manufactured using a variety of different materials and it must be packed carefully. A correct folding method is very important to extend the useful life of your paraglider.

It should be concertina-packed, with the leading edge reinforcements flat and the flexible rods stacked one on top of the other. This method will keep the profile in its original shape and protect the integrity of the wing over time. Make sure the reinforcements are not bent or folded. It should not be folded too tightly to avoid damage to the cloth and/or lines.

Niviuk have designed the NKare Bag and the ZipNkare. These will assist you in quickly folding the paraglider, keeping the profile and integrity of the internal structures in perfect condition.

The NKare Bag will guide you through the folding process by allowing you to place the rods one on top of the other on the longitudinal axis to "concertina" pack the glider. Then you can easily make the sectional folds that each model requires. This folding system guarantees that both the cloth and the reinforcements of the internal structure remain in perfect condition. With the ZipNkare, it is possible to perform exactly the same folding procedure and with its zip closed, becomes a much easier to carry case.

4. IN FLIGHT

We recommend that you read the certification test report. The report contains all the necessary information on the ROLLER 2 reacts during each of the tested manoeuvres.

It is important to point out that the appropriate response to each adverse manoeuvre can vary from size to size; even within the same size at maximum or minimum load the behaviour and reactions of the wing may vary.

Having the knowledge that the testing house provides through the test report is fundamental to learning how to deal with possible situations.

To become familiar with the manoeuvres described below, we recommend practising within the auspices of a licensed training outfit.

4.1 FLYING IN TURBULENCE

The ROLLER 2 has an excellent profile to deal with incidents; it is very stable in all conditions and has a high degree of passive safety, even in turbulent conditions.

Under normal conditions, we should not expect any incidents with the ROLLER 2, even in thermals or turbulent conditions, its profile and high internal pressure absorbs them. In severe turbulence the wing may lose pressure but will regain it immediately. Collapses are unlikely, but cannot be ruled out. If they do occur, the best way to prevent them is through more active flying. In such conditions, it is best if the trimmers are set to neutral.



The ROLLER 2 is able to stay airborne in strong winds when conventional paragliders can no longer fly. However, if conditions are very turbulent, we recommend not flying until the forecast improves.

All paragliders must be piloted for the prevailing conditions and the pilot is the ultimate safety factor.

We recommend active flying in turbulent conditions, always taking measures to maintain control of the wing, preventing it from collapsing and restoring the speed required by the wing after each correction.

Do not correct the glider (braking) for too long in case this provokes a stall. If you have to take corrective action, make the input then re-establish the correct flying speed.

4.2 POSSIBLE CONFIGURATIONS

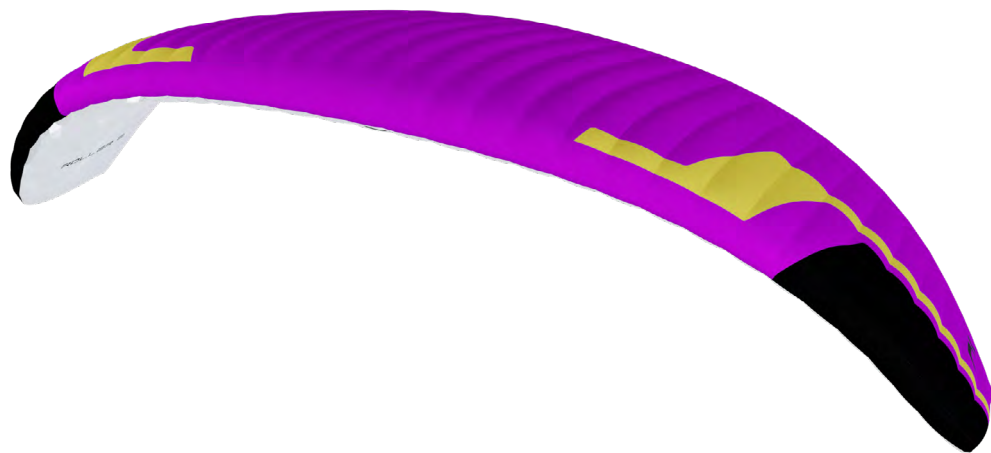
To become familiar with the manoeuvres described below, we recommend practising within the environment of a licensed training outfit. You must adapt your use of the brakes depending on the wing-loading and avoid over-steering.

It is important to note that the type of reaction to a manoeuvre can vary from one size of wing to another, and even within the same size the behaviour and reactions may be different depending on the wing-loading.

In the test report, you will find all the necessary information on how to handle your new wing during each of the tested manoeuvres. Having this information is crucial to know how to react during these manoeuvres in real flight, so you can deal with these situations as safely as possible.

Asymmetric collapse

In spite of the ROLLER 2's profile stability, strong turbulent air may cause the wing to collapse asymmetrically in very strong turbulence, especially if you do not fly actively and prevent the collapse. In this case the glider



conveys a loss of pressure through the brake lines and the harness. To prevent the collapse from happening, pull the brake handle on the affected side of the wing. It will increase the incidence of the wing (angle of attack). If the collapse does happen, the ROLLER 2 will not react violently, the turning tendency is gradual and easily controlled. Weight-shift toward the open, flying side (the opposite side of the collapse) to keep the wing flying straight, while applying light brake pressure to that side if necessary. Normally, the collapsed side of the wing should then recover and reopen by itself. If it does not, try to weight-shift towards the collapsed side. If this does not resolve the issue, pull the brake handle on the collapsed side decisively and quickly all the way (100%) down and release it back up immediately. You may have to repeat this action to provoke the re-opening of the collapsed glider side. Do not over-brake or slow down the flying side of the wing (control the turn). Once the collapsed side is open make sure you return to normal flying speed.

Frontal collapse

Due to the ROLLER 2's design, in normal flying conditions frontal collapses are unlikely to take place. The wing's profile has great buffering abilities when dealing with extreme incidence changes. A frontal collapse may occur in strong turbulent conditions, entering or exiting powerful thermals. Frontal collapses usually re-inflate without the glider turning, but a symmetrically applied quick braking action with a quick deep pump of both brakes will accelerate the re-inflation if necessary. Release the brake lines immediately to return to default glider air speed.

Negative spin

A negative spin does not conform to the ROLLER 2's normal flight behaviour. Certain circumstances however, may provoke a negative spin (such as trying to turn when flying at very low air speed whilst applying a lot of brake). It is not easy to give any specific recommendation about this situation other than quickly restoring the wing's default air speed and angle of attack by progressively reducing the tension on the brake lines. The normal wing reaction will be to have a lateral surge on the re-accelerated side with a rotation not greater than 360° before returning to default air speed and a straight flight path trajectory.

Parachutal stall

The possibility of entering or remaining in a parachutal stall have been eliminated from the ROLLER 2.

A parachutal stall is virtually impossible with this wing. If it did enter into a parachutal stall, the wing loses forward motion, becomes unstable and there is a lack of pressure on the brake lines, although the canopy appears to be fully inflated. To regain normal air speed, release brake line tension symmetrically and manually push on the A-lines or weight-shift your body to any side WITHOUT PULLING ON THE BRAKE LINES.

Deep Stall

The possibility of the ROLLER 2 stalling during normal flight is very unlikely. It could only happen if you are flying at a very low air speed, whilst over-steering or performing dangerous manoeuvres in turbulent air.

To provoke a deep stall, the wing has to be slowed down to its minimum air speed by symmetrically pulling the brake lines all the way (100%) down until the stall point is reached and held there. The glider will first pitch rearward and then reposition itself overhead, rocking slightly, depending on how the manoeuvre is done.

When entering a stall, remain clear-headed and ease off the brake lines until reaching the half-way point of the total brake travel. The wing will then surge violently forward and could reach a point below you. It is most important to maintain brake pressure until the glider has returned to its default overhead flying position.

To resume normal flight conditions, progressively and symmetrically release the brake line tension to regain air speed. When the wing reaches the overhead position, the brakes must be fully released. The wing will

then surge forward to regain full air speed. Do not brake excessively at this moment as the wing needs to accelerate to pull away from the stall configuration. If you have to control a possible frontal collapse, briefly pull both brake handles down to bring the wing back up and release them immediately while the glider is still in transition to reposition itself overhead.

Cravat

A cravat may happen after an asymmetric collapse, when the end of the wing is trapped between the lines. Depending on the nature of the tangle, this situation could rapidly cause the wing to spin. The corrective manoeuvres to use are the same as those applied in case of an asymmetric collapse: control the turn/spin by applying tension on the opposite brake and weight shift opposite to the turn. Then locate the stabilo line (attached to the wing tip) trapped between the other lines. This line has a different colour and is located on the outside position of the A-riser.

Pull this line until it is taut. This action will help to release the cravat. If ineffective, fly down to the nearest possible landing spot, controlling the direction with both weight-shift and the use of the brake opposite to the tangled side. Be cautious when attempting to undo a tangle while flying near terrain or other paragliders; it may not be possible to continue on the intended flight path.

Over-controlling

Most flying problems are caused by wrong pilot input, which then escalates into a cascade of unwanted and unpredicted incidents. We should note that the wrong inputs can lead to loss of control of the glider. The ROLLER 2 was designed to recover by itself in most cases. Do not try to over-correct it!

Generally speaking, the reactions of the wing, which are caused by too much input, are due to the length of time the pilot continues to over-control the wing. You have to allow the glider to re-establish normal flying speed and attitude after any type of incident.

4.3 ACCELERATED FLIGHT

The ROLLER 2's profile was designed for stable flight throughout its entire speed range. Accelerating the wing can be useful in strong winds or significant sink.

When accelerating the wing, the profile becomes more sensitive to turbulence and closer to a possible frontal collapse. If a loss in internal wing pressure is felt, tension on the speed-bar should be reduced to a minimum and a slight pull on the brake lines is recommended to increase the wing's incidence angle. Remember to re-establish the air speed after correcting the angle of attack.

It is NOT recommended to accelerate near obstacles or in very turbulent conditions. If necessary, constantly adjust the movements and pressure on the speed-bar whilst doing the same to the brake lines. This balance is considered to be 'active piloting'.

4.4 FLYING WITHOUT BRAKE LINES

If, for any reason at all, the ROLLER 2's brake lines become disabled in flight, it will become necessary to pilot the wing gently using the C-risers and weight shifting until landing. These risers steer easily because are not under significant tension. You will have to be careful and not handle them too heavily in case this causes a stall or negative spin. The wing must be flown at full speed (not accelerated) during the landing approach, and the C-risers should be pulled symmetrically shortly before contact with the ground. This braking method is not as effective as using the brake lines, and hence the wing will land with a higher ground speed.

4.5 LINE KNOT(S) IN FLIGHT

The best way to avoid knots and tangles is to thoroughly inspect the lines as part of a systematic pre-flight check. If a knot is spotted during the take off phase, immediately abort the launch sequence and stop.

If inadvertently taking off with a knotted line, the glider drift will need to be compensated by weight-shifting to the opposite side and applying a slight brake pull to that side. Gently pull the brake line to see if the knot can be undone or try to locate the problem line. Try pulling it to see if the knot can be undone. Beware of trying to clear a knotted line or untangle a line in flight when close to the terrain. If the knot is too tight and cannot be undone, carefully and safely fly to the nearest landing zone. Be careful: do not pull too hard on the brake handles because there will be an increased risk of stalling the wing or entering a negative spin. Before attempting to clear a knot, make sure there are no other pilots flying in the vicinity.



5. LOSING ALTITUDE

Knowledge of different descent techniques could become vital in certain situations. The most suitable descent method will depend on the particular situation.

To become familiar with the manoeuvres described below, we recommend practising within the environment of a licensed training outfit.

5.1 BIG EARS

“Big Ears” is a moderate descent technique, able to increase the sink rate to -3 a -4 m/s, and reduces the ground speed by 3 to 5 km/h. The angle of attack and effective wing-loading will also increase due to the smaller surface area of the wing.

To perform the Big Ears manoeuvre, take the 3A2 line on each A-riser and simultaneously, smoothly pull them outward and downward. The wingtips will fold in.

To re-establish forward speed and the correct angle of attack, accelerate once the ears are pulled.

Keep the ears pulled in until you have lost the desired altitude.

Let go of the lines to re-inflate the tips automatically. If they do not, try progressively pulling one brake then the other. Asymmetric reopening is recommended in order to avoid compromising the angle of attack, particularly flying near the ground or in turbulent conditions.

5.2 B-LINE STALL

When this manoeuvre is performed, the glider stops flying, there is no horizontal speed and no control over



the glider. The air circulation over the profile is interrupted and the ROLLER 2 is left in a situation similar to a parachute.

To do this, grab the B-risers under the maillons and pull down symmetrically (approximately 20-30 cm) while maintaining the position.

Initially, the manoeuvre requires some physical strength, so pull hard until the profile deforms, when the force required will be much less. From then on, the action should be continued without releasing the risers. The wing will deform, its horizontal speed will become 0 km/h, and its vertical speed will increase to -6 to -8 m/s depending on the conditions and how the manoeuvre was performed.

To release the wing, let go of the risers simultaneously. The glider will react with pitch gently and return to normal flight on its own. It is better to release the risers quickly rather than slowly. It is an easy manoeuvre, but it must be taken into account that the glider stops flying, there is no wind speed and the reactions are very different from normal flight.

5.3 SPIRAL DIVE

This is a more effective way to rapidly lose altitude. Beware that the wing will experience and be subjected to a tremendous amount of descending and rotating speed (g-force), which can cause a loss of orientation and consciousness (blackout). This manoeuvre must therefore be done gradually to increase one's capacity to resist the g-force exerted on the body. With practise, you will fully appreciate and understand it. Only practise this manoeuvre at high altitude and with enough ground clearance.

To start the manoeuvre, first weight shift and pull the brake handle located on the inner side of the turn. The intensity of the turn can be controlled by braking slightly using the outer brake handle.

A paraglider flying at its maximum rotating speed can reach -20 m/s, or the equivalent of a 70 km/h vertical descent, and will stabilise in a spiral dive from 15 m/s onwards. Good enough reasons to familiarise yourself with the manoeuvre and understand how to exit it.

To exit this manoeuvre, the inner brake handle (down side of the turn) must progressively be relaxed while momentarily applying tension to the outer brake handle opposite to the turn.

The pilot must also weight shift and lean towards the opposite side of the turn at the same time.

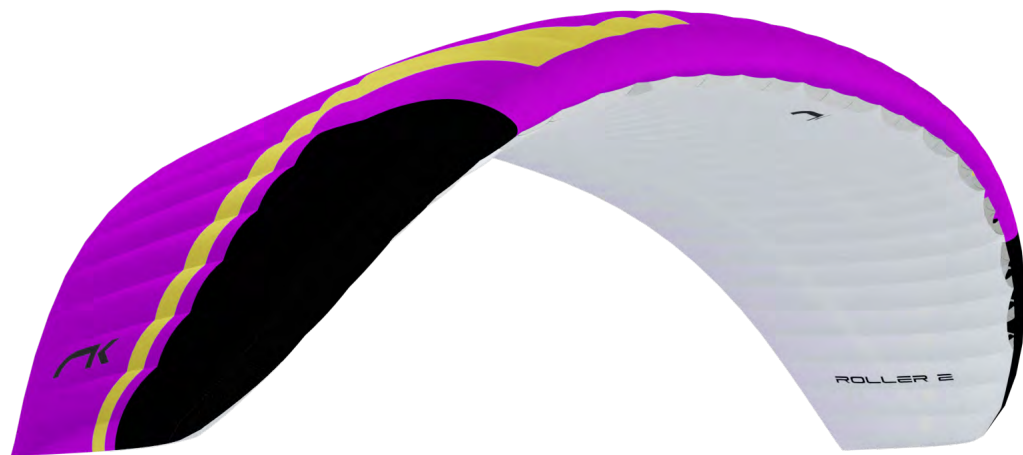
The exit should be performed gradually and smoothly so that the changes in pressure and speed can be noted. When exiting the spiral, the glider will briefly experience an asymmetrical acceleration and dive, depending on how the manoeuvre was carried out.

Practise these manoeuvres at sufficient altitude and carefully.

5.4 SLOW DESCENT TECHNIQUE

This technique allows descent without straining the wing or taxing the pilot. Glide normally while searching for descending air and begin to turn as if climbing in a thermal, but with the intention to sink.

Common sense has to be used to avoid dangerous areas of rotor when looking for descending air. Safety first!



6. SPECIAL METHODS

6.1 TOWING

The ROLLER 2 does not experience any problem whilst being towed. Only qualified winch personnel should handle the certified equipment to carryout this operation. The wing must be inflated similarly as during a normal take off. It is important to use the brakes to correct the flight path, especially if the glider begins to turn. Since the wing is subject to a slow airspeed and with a high positive angle of attack, we must make any corrections with a high degree of feel and delicacy, in order to avoid a stall.

6.2 ACROBATIC FLIGHT

We consider extreme or acrobatic flights to be any form of piloting different than standard flights. Learning aerobatic/acrobatic manoeuvres should be conducted under the supervision of qualified instructors within a school environment and over water with all safety/rescue elements in place. When performing extreme maneuvers, you will subject both the glider and your body to centrifugal forces that can reach up to 4 or 5 g, wearing down the material much faster than with normal flight.

The ROLLER 2 is a glider with an extensive speed range, capable of being manoeuvred quickly and hyper-precisely at all times. Extremely dynamic and responsive, it is pure performance for pilots capable of active flying. The efficiency of the brakes means the pilot receives a lot of feedback. This makes it easy for the pilot to predict and control the glider at all times.

It is fitted with highly efficient trimmers and speed system. The combination of the two settings enables an infinite number of angles of attack (and therefore speeds) and more importantly, allows the pilot to enjoy the glider beyond downhill flying, whether it be turning thermals or soaring, as well as having fun, practicing barrel rolls, swoops or playing with height/speed.

7. CARE AND MAINTENANCE

7.1 MAINTENANCE

Careful maintenance of your equipment will ensure continued top performance. Apart from the general checks, we recommend actively maintaining your equipment.

A pre-flight check is obligatory before each flight.

If there is any damage to the equipment or you suspect any areas of the wing are susceptible to wear, you should inspect these and act accordingly.

Niviuk we are firmly committed to make technology accessible to all pilots. Therefore, our wings are equipped with the latest technological advances gained from the experience of our R&D team. Thanks to these new technologies, paragliders are gaining more safety and performance, which requires greater care of the materials.



PLEASE NOTE : it is critical to avoid any kind of impact or dragging the leading edge on the ground. This part is reinforced with very durable and strong Nitinol rods that can be easily replaced. Dragging and/or hitting the leading edge can cause serious damage to the fabric, which is much more complicated and costly to repair.

The fabric and the lines do not need to be washed. If they become dirty, clean them with a soft damp cloth, using only water. Do not use detergents or other chemicals.

If your wing is wet from contact with water, place it in a dry area, air it and keep it away from direct sunlight.

Direct sunlight may damage the wing's materials and cause premature aging. After landing, do not leave the wing exposed to the sun. Pack it properly and stow it away in its backpack.

If you fly in sandy areas, avoid getting sand in the cells or down into the trailing edge. At the end of the flight, empty any sand that is in your wing. The openings at the end of the wingtips make this much easier.

If your wing is wet from contact with salt water, immerse it in fresh water and dry it away from direct sunlight.

7.2 STORAGE

It is important for the wing to be correctly folded when stored. Keep it in the in a cool, dry place away from solvents, fuels, oils.

Do not leave your gear inside a car boot, as cars left in the sun can become very hot. A rucksack can reach temperatures up to 60°C.

Weight should not be laid on top of the equipment.

It is very important to pack the wing correctly before storage.

In case of long-term storage, it is advisable, if possible, that the wing is not compressed and it should be stored loosely without direct contact with the ground. Humidity and heating can have an adverse effect on the equipment.

7.3 CHECKS AND INSPECTIONS

The ROLLER 2 must be periodically serviced. An inspection must be scheduled every 100 flying hours or every two years, whichever comes first.

We strongly recommend that any repairs should be done in a specialist repair shop by qualified personnel.

This will guarantee the airworthiness and continued certification of the ROLLER 2.

A thorough pre-flight check must be performed before every flight.

7.4 REPAIRS

In the case of small tears, you can temporarily repair these by using the Ripstop tape included in the repair kit, as long as no stitching is required to mend the fabric.

Any other tears or repairs should be done in a specialist repair shop by qualified personnel.

Damaged lines must be repaired or exchanged immediately.

Please refer to the line plan at the end of this manual.

We recommend any inspection or repair is performed by a Niviuk professional in our official workshop:

<https://niviuk.com/niviuk-service-form>

Any modification of the glider made in an external workshop will invalidate the guarantee of the product.

Niviuk cannot be held responsible for any issues or damage resulting from modifications or repairs carried out by unqualified professionals or who are not approved by the manufacturer.



8. SAFETY AND RESPONSIBILITY

It is well known that free-flying with a paraglider is considered a high-risk sport, where safety depends on the person who is practicing it.

Incorrect use of this equipment may cause severe, life-changing injuries to the pilot, or even death. Manufacturers and dealers cannot be held responsible for your decisions, actions or accidents that may result from participating in this sport.

You must not use this equipment if you have not been properly trained to use it. Do not take advice or accept any informal training from anyone who is not properly qualified as a flight instructor.



PLEASE NOTE

The pilot is responsible for their decisions and it is up to them to assess whether the weather, wind, flying and landing conditions and their level of piloting, skills and experience are sufficient for the intended flight and the risks involved.

9. GARANTEE

The equipment and components are covered by a 2-year warranty against any manufacturing defect.

The warranty does not cover misuse of the equipment.

Any modification to the paraglider or its components invalidates the guarantee and the certification.

If you notice a fault or defect on your paraglider, contact Niviuk immediately for a full inspection.

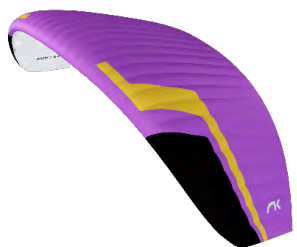


10. ANNEXES

10.1 TECHNICAL SPECIFICATIONS

| | | | 14 | 16 | 18 | 20 |
|------------------------|-----------|----------------|----------|----------|----------|----------|
| Cells | Number | | 35 | 35 | 35 | 35 |
| Aspect ratio | Flat | | 4.2 | 4.2 | 4.2 | 4.2 |
| | Projected | | 3.6 | 3.6 | 3.6 | 3.6 |
| Area | Flat | m ² | 14 | 16 | 18 | 20 |
| | Projected | m ² | 12.41 | 14.19 | 15.98 | 17.76 |
| Span | Flat | m | 7.82 | 8.36 | 8.87 | 9.36 |
| Chord | Max | m | 2.14 | 2.23 | 2.43 | 2.56 |
| Lines | Total | m | 185 | 199 | 211 | 223 |
| | Main | | 2/3/2 | 2/3/2 | 2/3/2 | 2/3/2 |
| Risers | Number | 3 | A/B/C | A/B/C | A/B/C | A/B/C |
| | Speed-bar | mm | 90 | 90 | 90 | 90 |
| | Trimmers | mm | 100 | 100 | 100 | 100 |
| Glider weight | | kg | 3 | 3.3 | 3.6 | 3.9 |
| Total weight in flight | Min-max | kg | 60-90 | 70-100 | 80-110 | 90-120 |
| Certification | | | EN 926-1 | EN 926-1 | EN 926-1 | EN 926-1 |

COLORS



Illusion



Belo

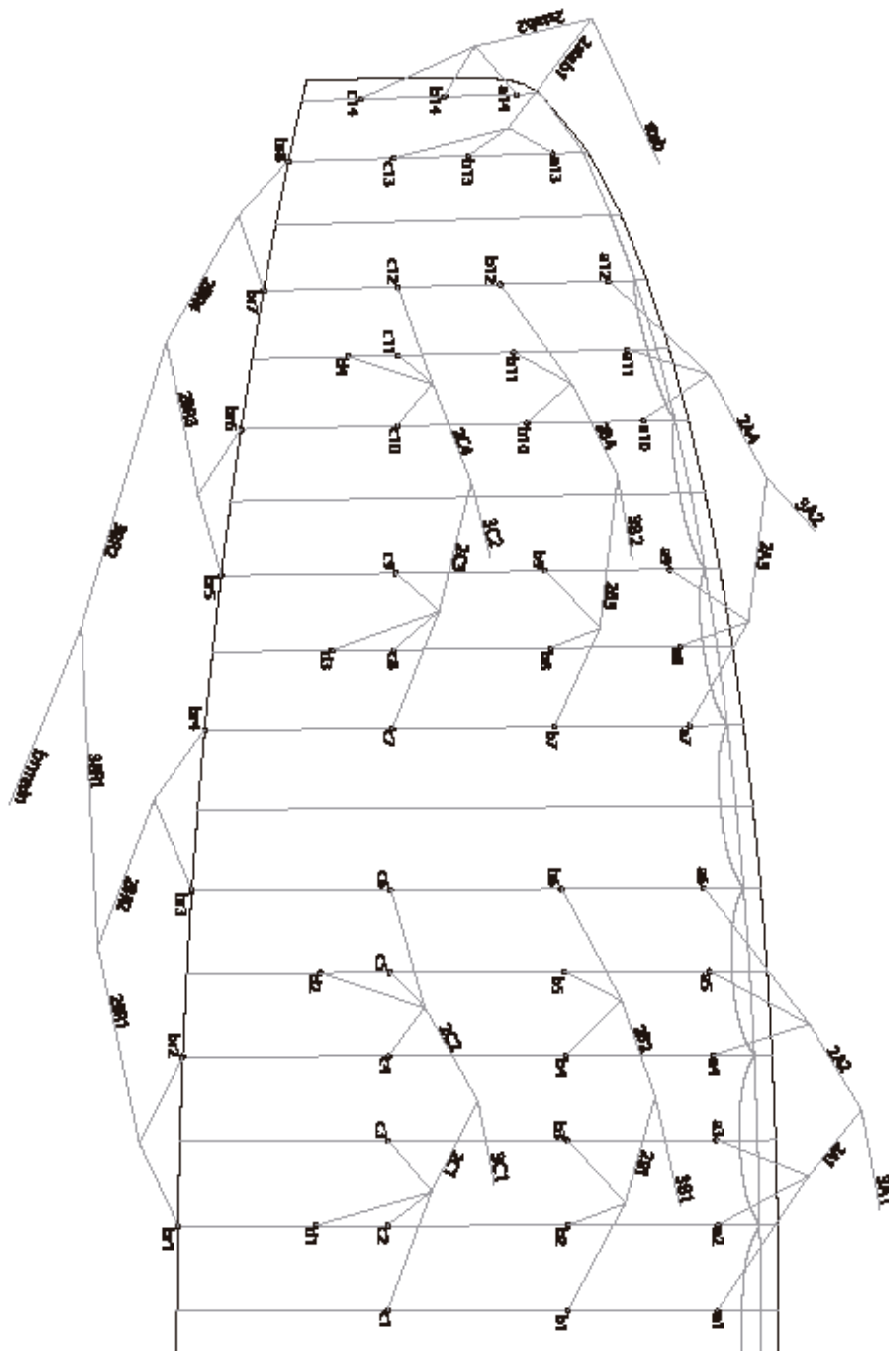
10.2 MATERIALS TECHNICAL DATA

| CANOPY | FABRIC CODE | SUPPLIER |
|-----------------------------|---------------|-------------------------|
| UPPER SURFACE | N30 DMF | DOMINICO TEX CO (KOREA) |
| BOTTOM SURFACE | N20 DMF | DOMINICO TEX CO (KOREA) |
| RIBS | 30 DFM | DOMINICO TEX CO (KOREA) |
| DIAGONALS | 30 DFM | DOMINICO TEX CO (KOREA) |
| LOOPS | LKI - 10 | KOLON IND. (KOREA) |
| REINFORCEMENT LOOPS | W-420 | D-P (GERMANY) |
| TRAILING EDGE REINFORCEMENT | MYLAR | D-P (GERMANY) |
| REINFORCEMENT RIBS | LTN-0.8 STICK | SPORTWARE CO. (CHINA) |
| THREAD | SERAFIL 60 | AMAN (GERMANY) |

| SUSPENSION LINES | FABRIC CODE | SUPPLIER |
|------------------|-------------|------------------------|
| UPPER CASCADES | DC - 60 | LIROS GMHB (GERMANY) |
| MIDDLE CASCADES | DC - 60 | LIROS GMHB (GERMANY) |
| MIDDLE CASCADES | PPSL - 120 | LIROS GMHB(GERMANY) |
| MIDDLE CASCADES | TNL - 140 | TEIJIM LIMITED (JAPAN) |
| MAIN | PPSL - 120 | LIROS GMHB(GERMANY) |
| MAIN | TNL - 280 | TEIJIM LIMITED (JAPAN) |
| MAIN | TNL - 400 | TEIJIM LIMITED (JAPAN) |
| MAIN BREAK | TARAX-200 | EDELRID (GERMANY) |
| THREAD | SERAFIL 60 | AMAN (GERMANY) |

| RISERS | FABRIC CODE | SUPPLIER |
|-----------------|-------------|--------------------------|
| MATERIAL | G-R 19 | TECNI SANGLES (FRANCE) |
| COLOR INDICATOR | PAD | TECNI SANGLES (FRANCE) |
| THREAD | V138 | COATS (ENGLAND) |
| MAILLONS | MRI4 | ANSUNG PRECISION (KOREA) |
| PULLEYS | PY - 1304-2 | ANSUNG PRECISION (KOREA) |

10.3 LINE PLAN



LINE REPLACEMENT

The use of new high performance materials in modern wings is now common. The advantages of using these materials in terms of performance are widely acknowledged as part of our sport's evolution. However, along with those technological advances come additional responsibilities which cannot be avoided. As a result, line inspection and replacement must be carried out more frequently. That increased frequency appears to be encouraging some pilots to try to perform line replacement themselves.

WE STRONGLY RECOMMEND ANY LINE REPLACEMENT IS PERFORMED BY AN AUTHORISED SPECIALIST ONLY.

Ultimately, if the pilot decides to perform any line replacement without professional oversight they therefore assume all responsibility. In this case, these guidelines will have to be followed.

BEFORE REMOVING ANY LINES, CHECK:

- That the line plan is correct according to the glider model and size.
- That the line kit is complete and correct.
- Never assume but always check each individual line for the correct specification.

AFTER CONFIRMING THAT ALL LINES ARE CORRECT:

- Fit the new line(s) WITHOUT removing the label.
- Once replaced, measure each line length to confirm the correct measurement.
- Inflate the wing to check for any irregularities.
- The line labels may then be removed but NOT BEFORE completion of the line replacement.

Niviuk strongly recommends for any line replacement to be carried out by an authorised professional only, and will not accept responsibility for any damage or injury caused as a result of incorrect re-assembly.

10.4 RISER PLAN



10.5 LINE MEASUREMENTS

Roller 2 - 14

LINES HEIGHT mm

| | A | B | C | D | BR |
|----|------|------|------|------|------|
| 1 | 4425 | 4351 | 4460 | 4421 | 5128 |
| 2 | 4360 | 4287 | 4370 | 4391 | 4772 |
| 3 | 4340 | 4269 | 4338 | 4383 | 4661 |
| 4 | 4337 | 4269 | 4334 | 4314 | 4695 |
| 5 | 4337 | 4273 | 4345 | | 4639 |
| 6 | 4376 | 4316 | 4406 | | 4589 |
| 7 | 4374 | 4322 | 4414 | | 4601 |
| 8 | 4332 | 4287 | 4357 | | 4703 |
| 9 | 4321 | 4282 | 4343 | | |
| 10 | 4281 | 4255 | 4316 | | |
| 11 | 4254 | 4236 | 4306 | | |
| 12 | 4253 | 4242 | 4330 | | |
| 13 | 4118 | 4094 | 4149 | | |
| 14 | 4091 | 4082 | 4161 | | |

RISERS LENGHT mm

| A | B | C | |
|-----|-----|-----|----------------|
| 480 | 480 | 480 | STANDARD |
| 480 | 507 | 580 | TRIMMER OPENED |
| 390 | 445 | 580 | ACCELERATED |

10.6 LINE MEASUREMENTS

Roller 2 - 16

LINES HEIGHT mm

| | A | B | C | D | BR |
|----|------|------|------|------|------|
| 1 | 4761 | 4684 | 4801 | 4762 | 5517 |
| 2 | 4694 | 4617 | 4706 | 4735 | 5138 |
| 3 | 4674 | 4599 | 4673 | 4729 | 5020 |
| 4 | 4673 | 4601 | 4671 | 4657 | 5058 |
| 5 | 4675 | 4607 | 4684 | | 5001 |
| 6 | 4718 | 4654 | 4751 | | 4949 |
| 7 | 4718 | 4663 | 4759 | | 4963 |
| 8 | 4674 | 4625 | 4699 | | 5074 |
| 9 | 4663 | 4620 | 4684 | | |
| 10 | 4621 | 4592 | 4656 | | |
| 11 | 4593 | 4572 | 4646 | | |
| 12 | 4592 | 4580 | 4672 | | |
| 13 | 4447 | 4420 | 4479 | | |
| 14 | 4417 | 4407 | 4491 | | |

RISERS LENGHT mm

| A | B | C | |
|-----|-----|-----|----------------|
| 480 | 480 | 480 | STANDARD |
| 480 | 507 | 580 | TRIMMER OPENED |
| 390 | 445 | 580 | ACCELERATED |

10.7 LINE MEASUREMENTS

Roller 2 - 18

LINES HEIGHT mm

| | A | B | C | D | BR |
|----|------|------|------|------|------|
| 1 | 5079 | 4996 | 5121 | 5083 | 5884 |
| 2 | 5008 | 4926 | 5022 | 5058 | 5483 |
| 3 | 4989 | 4909 | 4988 | 5056 | 5359 |
| 4 | 4989 | 4912 | 4987 | 4981 | 5401 |
| 5 | 4992 | 4919 | 5001 | | 5342 |
| 6 | 5039 | 4971 | 5074 | | 5288 |
| 7 | 5040 | 4983 | 5085 | | 5304 |
| 8 | 4994 | 4943 | 5022 | | 5423 |
| 9 | 4982 | 4938 | 5006 | | |
| 10 | 4939 | 4909 | 4977 | | |
| 11 | 4910 | 4889 | 4967 | | |
| 12 | 4909 | 4897 | 4995 | | |
| 13 | 4756 | 4727 | 4789 | | |
| 14 | 4723 | 4713 | 4801 | | |

RISERS LENGHT mm

| A | B | C | |
|-----|-----|-----|----------------|
| 480 | 480 | 480 | STANDARD |
| 480 | 507 | 580 | TRIMMER OPENED |
| 390 | 445 | 580 | ACCELERATED |

10.8 LINE MEASUREMENTS

Roller 2 - 20

LINES HEIGHT mm

| | A | B | C | D | BR |
|----|------|------|------|------|------|
| 1 | 5378 | 5294 | 5435 | 5397 | 6229 |
| 2 | 5305 | 5221 | 5331 | 5373 | 5808 |
| 3 | 5285 | 5204 | 5297 | 5374 | 5679 |
| 4 | 5286 | 5207 | 5296 | 5296 | 5725 |
| 5 | 5291 | 5216 | 5313 | | 5665 |
| 6 | 5341 | 5271 | 5390 | | 5610 |
| 7 | 5346 | 5285 | 5403 | | 5628 |
| 8 | 5298 | 5244 | 5335 | | 5753 |
| 9 | 5286 | 5239 | 5319 | | |
| 10 | 5242 | 5209 | 5290 | | |
| 11 | 5211 | 5188 | 5279 | | |
| 12 | 5211 | 5197 | 5309 | | |
| 13 | 5048 | 5018 | 5088 | | |
| 14 | 5014 | 5003 | 5101 | | |

RISERS LENGHT mm

| A | B | C | |
|-----|-----|-----|----------------|
| 480 | 480 | 480 | STANDARD |
| 480 | 507 | 580 | TRIMMER OPENED |
| 390 | 445 | 580 | ACCELERATED |

10.9 CERTIFICATION

AIR TURQUOISE SA | PARA-TEST.COM

Route du Pré-au-Comté 8 • CH-1844 Villeneuve • +41 (0)21 965 65 65

Test laboratory for paragliders, paraglider harnesses
and paraglider reserve parachutes



CERTIFICATE

Air Turquoise SA has thoroughly tested the structural strength of the sample⁽¹⁾ mentioned hereunder and certifies its conformity with the standards EN 926-1:2015 & NPL 2-565-20 chapter 3.

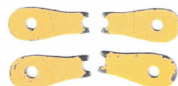
This certificate confirms that the hereunder sample⁽¹⁾, identified by its serial number⁽²⁾.

| | |
|----------------------|-----------------------------------|
| Manufacturer's name: | Niviuk Gliders - Air Games |
| Representative: | Dominique Cizeau |
| Street: | C. Del Ter, 6-Nave D |
| Post code / place: | 17165 La Cellera de Ter Girona |
| Country: | Spain |

| | |
|---------------------------------------|-------------------------------|
| Identification number: | PS_124.2022 |
| Sample name and size ⁽³⁾ : | Roller 2 18 |
| Serial number ⁽⁴⁾ : | Skate GS 4-18 |
| Riser configuration: | With trimmer and speed system |
| Date of inspection: | 29.01.2016 |

Shock loading test done at **800 [daN]**.

The sample showed no visible damage that could prevent its airworthiness.



Sustained loading test

The sample was tested up to 8 [g] of maximum total weight in flight during 3 seconds.

Maximum total weight in flight: **119 [kg]**.

Remark:

Villeneuve, 22.02.2022

Place and date of issue

Andrea Wigger



Niviuk Gliders & Air Games SL

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