TAKOO 5

User's manual

TAKOO 5

IT'S TIME TO GET CLOSER

We wish to welcome you to our team and thank you for your confidence in our glider product line.

We would like to share the enthusiasm with which we created the TAKOO 5 and the importance and care we took in the design and manufacture of this new model in order to offer maximum pleasure on every flight with a Niviuk glider.

The fifth generation of the Takoo marks the end of distancing between pilot and passenger. A stable, safe wing with excellent maneuverability to satisfy the demands of both adventurers.

We are confident you will enjoy flying this glider and will soon discover the meaning of our motto:
"The importance of small details".
This is the user manual and we recommend you read it carefully.

The Niviuk Team.
end you read it carefully.
The **NIVIUK Gliders** Team.

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USER'S MANUAL

NIVIUK Gliders TAKOO 5

This manual provides you with the necessary information on the main characteristics of your new TAKOO 5.

Whilst it provides information on the wing, 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 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 TAKOO 5 manual.

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

SUMMARY

1. CHARACTERISTICS

1.1 WHO IS IT DESIGNED FOR?

Commercial tandem flights:
A tandem wing designed to satisfy the most exacting professional dual pilots. Its durability and performance make this a glider that you will not want to part with.

Recreational flights:
Experience a tandem wing as you never imagined it and let yourself be carried away by its supreme comfort and stability. Enjoy each flight with a tandem that adapts perfectly to your needs and those of your passenger.

1.2 CERTIFICATION

The paraglider 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 8G.

The shock test proved that the wing can resist 1200 daN of force.

The flight test resulted in the following certification for all sizes:

EN B
LTF B

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.

- Description of EN B class wing characteristics:

Paragliders with a high degree of passive safety and very forgiving flight characteristics. Gliders with high collapse resistance outside normal flight.

- Description of the skills required by the pilot to fly an EN B wing:
Designed for all pilots, including pilots under instruction.

For further information on the flight test and the corresponding certification number, please see the final pages of this manual or see niviuk.com.

1.3 IN-FLIGHT BEHAIVOR

The TAKOO 5 features a more robust internal structure with an improved load distribution at the attachment points. It has an optimised light and responsive brake system for improved turning.
Regarding the take off, it inflates more progressively and will take the weight of pilot and passenger immediately. At the end of the flight, its excellent speed retention ensures smooth and safe landings.
The TAKOO 5 has a high degree of pitch stability; increasing passenger

comfort by decreasing the transmission of movements from the wing to the passenger

1.4 CONSTRUCTION, MATERIALS

The TAKOO 5 has all the technological innovations used on other Niviuk gliders and is built with the most careful selection of current materials. 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 - The Ram Air Intake 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.

TNT (Titanium Technology) - Nitinol is a combination of 50% nickel and 50% titanium. This technology provides three outstanding benefits that increase the performance of the wing, compared to plastic rods. *With the incorporation of the Nitinol rods, the weight of the wing is reduced by 13% compared to nylon.

*Nitinol has closely related properties. It has shape memory and enormous elasticity. This means that the rods maintain their optimum shape even after ultra-compact or bad folding, so that the wing does not suffer from deformation unless the radius at the point of bending is less than 1 cm.
*The leading edge shape is much more rigid and uniform. This means a much more consistent and progressive inflation; which translates into an easier take-off. The profile is taut at all times, without creases or wrinkles, and fully optimised for all flight phases.

In addition, the rods have a plastic protector at their ends to prevent any damage to the fabric of the wing. Nitinol is now featured in all our wings.
SLE (Structured Leading Edge) - The SLE is a rigid structure located at the leading edge of the wing that eliminates the need for old-fashioned mylar reinforcements in this area, thus reducing the weight and increasing the durability of the wing. The leading edge will also have better turbulence absorbing qualities. In addition, the SLE provides greater solidity and strength in the leading edge to maintain its shape at all speeds and angles of attack, thus increasing performance.

3DP (3D Pattern Cut Optimization) - This technology seeks to implement the best orientation of the cloth on each panel according to its location on the leading edge. If the cloth pattern is correctly aligned with the load axes, the cloth suffers less deformation flight after flight, so the leading edge keeps its shape better and maintains its durability over time. The design of our paraglider and paramotor wings has evolved a lot over the years, significantly affecting the leading edge.
The application of this innovation, in conjunction with the 3DL, is key to converting the perfect shape from 2D to 3D.

3DL (3D Leading Edge) - 3DL technology is an adjustment of the fabric at the leading edge of the wing to control the ballooning and the creases that are generated by the curvature in this area. The leading edge is then divided into sub-panels which are sewn into each of the cells at the front of the wing. As a result, the leading edge of the wing is more evenly tensioned, which benefits the wing in performance and durability. As an example, because of its similarity, imagine a rugby ball. In order to produce its characteristic oval shape without wrinkles, its cover is made

of several panels - not of just one piece.
The application of this innovation, in conjunction with the 3DP, is key to converting the perfect shape from 2D to 3D.

STE (Structured Trailing Edge) - The STE provides a rigid structure at the trailing edge in order to maintain its shape in accelerated flight. In addition, the rigidity provided by these elements improves the load distribution, reducing wrinkles, and consequently drag, and therefore ensuring better performance.

DRS (Drag Reduction Structure) - With the application of the DRS, the airflow at the trailing edge is directed more progressively along the adverse pressure gradient with the aim of reducing the aerodynamic drag produced in this area. This increases performance without compromising safety or control of the wing.

ELS (Ear Lock System) - On a solo glider when the pilot has pulled big ears, they can only fly using weight-shift. On a tandem paraglider, although with the help of the passenger it is possible to achieve some control, in most cases this is insufficient when it is really needed. This is why Niviuk developed the ELS.
The Ear Lock System is standard equipment on the Takoo. This system provides a simple and effective solution for the tandem/dual pilot when quick descents are required with the use of ears.

ELS system advantages:

- Enables the pilot to lock and unlock the ears as desired.
- Gives full control to the pilot with the ears applied.
- Lets the pilot use the ears as long as necessary with no physical effort at all.
- Allows the pilot to use the trimmers without concern or restriction.
- Locks in the ears and prevents accidental opening.
- Still allows the conventional application of ears (it is optional)
- Can easily be uninstalled without affecting the rest of the equipment.

To use the Ear Lock System, simply pull the ear lock line downward until the knot passes through the ELS (lock system); then move it slightly horizontally forward, locking the knot in the groove. To release, pull the ear lock line down and release the knot from the groove. Then guide it vertically as it goes upward and back through the ELS. It is better to release the two ears separately (asymmetrically).

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 TAKOO 5 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 fabric used to manufacture the glider is light, resistant and durable. The fabric will not fade and is covered by our warranty.
The upper-lines are made from sheathed Dyneema and the rest are made of sheathed Kevlar.

The line diameter has been calculated depending on the workload and aims to achieve the required best performance with the least drag. The sheath protects the line cores from UV-rays and abrasions.
The lines are semi-automatically cut to length and all the sewing is completed under the supervision of our specialists.

Every line is checked and measured once the final assembly is concluded.
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 TAKOO 5 is delivered with a series of accessories that will greatly assist you in the maintenance of your paraglider:

- Spreader-bars, soft or rigid, 25cm/15cm.
- A Kargo bag. This bag is large enough to hold all equipment comfortably and with plenty of space.
- An inner bag to protect the wing during storage and transport.
- An adjustable compression strap to compress the inner bag and reduce its volume.
- A repair kit with self-adhesive Ripstop tape and spare O-rings to protect the maillons.

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 TAKOO 5.

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, B, C, D - lines the brake lines and corresponding risers. Make sure that there are no knots.

2.3 CONNECTING THE HARNESS

The TAKOO 5 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 TYPE OF HARNESS

The TAKOO 5 was certified EN B when tested with harnesses which

conformed to the following norms:
2. DV LuftGerPV §1, Nr. 7 c (LTF)
• European Standard EN926-2
• European Standard EN926-1

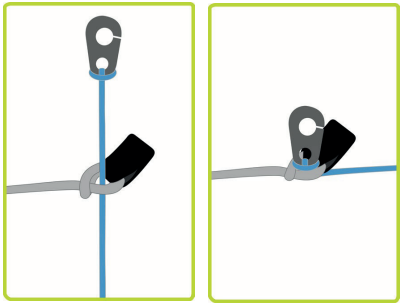
We recommend that both the pilot and passenger only use harness designed specifically for tandem flying.

2.5 TRIMMERS

The TAKOO 5 speed system is engaged when the trimmers are opened. The trimmers are situated on the D-riser. The efficiency of this new system provides a much wider range of speeds than was possible with the previous TAKOOs. To reduce speed, the trimmers must be closed until they are adjusted to the desired speed. The travel of this acceleration system starts from the neutral position until the maximum speed, when it is fully opened and conversely, the same up to the neutral point when it is closed.
We recommend the trimmers are set in the neutral position during take off. However, sometimes the circumstances of the take off require releasing the trimmers to adjust the speed of the wing inflation. The greater distance the trimmers are released, the faster the wing will inflate and, consequently, the pilot will have to exert more control over the wing at this stage.
The whole TAKOO series stands out for allowing precise control in the launch phase and allowing the pilot to perform the launch run with complete control, either in nil-wind or without being “pulled” by the wind.
Once in flight the pilot can adjust the trimmers to the required speed: slow = neutral trimmers / fast = trimmers open.
During landing, we recommend positioning trimmers in the first section of the travel.
However, the pilot must assess the conditions and adjust the trimmers for each landing. The TAKOO 5 always helps the pilot in this phase, allowing them to perform the landing manoeuvre with full control either using the neutral position or with the trimmers fully open.

Using the trimmers:

The trimmers must be manually operated by the pilot. They are situated on both D-risers.
To open the trimmers, press the trim tab inwards until the tape is released and them release the tab when the tape is in the chosen position. To close the trimmers, pull the tape down using the handle and release when you reach the required position.
The mechanisms of the trimmers are not visible, they covered in a protective neoprene sleeve. The neoprene sleeve is designed to avoid any tangles between lines and trimmers.
Once engaged, the trimmers must be set symmetrically. Along the travel of the tape there are 4 markings that allow the pilot to adjust the symmetry correctly and see the amount of travel used. A locking system is located at the end of the trim tape to ensure the surplus tape does not flap during flight.
The trimmers should not be used to steer the wing. The pilot should note that when releasing trimmers, the brake handle rises the same distance as the trimmers travel.
We recommend adjusting piloting during each flight according to the wing load and the travel of the trimmers used.



2.6 INSPECTION AND WING INFLATION ON THE GROUND

conditions deemed favourable for flying, inflate your TAKOO 5 as many times as necessary to familiarise yourself with its behaviour. Inflating the TAKOO 5 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, the length can be changed to adapt to the pilot's flying style.
The TAKOO 5 also has two additional connection points where you can set the height of the brake pulley. With 7 cm between them, this allows variation depending on the height of the pilot, type of harness or personal pilot preferences in terms of better handling, comfort and location of the brake handles.

If necessary, move the attachment point from its location and fix it in the new one.
CAREFUL
To undertake this operation, the knot must be moved the same distance as the attachment point has been moved along the webbing. The two attachment points are marked at the factory.
If you then decide to change the length of the brake lines, untie the knot, slide the line through the brake pulley to the desired length, and re-tie the knot so that it is tight. 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 of the same length. We recommend using a clove hitch or bowline knot.

3. THE FIRST FLIGHT

3.1 CHOOSE THE RIGHT LOCATION

For the first flight we recommend going to a gentle slope (training hill) or your usual, familiar flying area.

3.2 PREPARATION

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

3.3 FLIGHT PLAN

Planning a flight before taking off to avoid possible problems later is always a good idea.

3.4 PRE-FLIGHT CHECK LIST

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 TAKE-OFF

The TAKOO 5 comes up easily, without requiring additional energy, and does not overfly you. It is a straight-forward exercise, leaving enough time for you to decide whether to accelerate and take off or not.

If the wind permits, we recommend a reverse launch, as this allows a better visual inspection of the wing during inflation. In "strong" winds, the TAKOO 5 is especially easy to control using this launch technique. Winds of 25 to 30 km/h are considered strong for paragliding.

Correctly setting up the wing on the ground before take off is especially important. Choose an appropriate location facing the wind. Position the paraglider in a crescent configuration to facilitate inflation. A clean wing layout will ensure a trouble-free take off.

3.6 LANDING

The TAKOO 5 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.

3.7 PACKING

The TAKOO 5 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 Kolipro and the Kolibag rapid pack sacks.

4. IN FLIGHT

We recommend that you read the certification test report.

The report contains all the necessary information on how the TAKOO 5 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 TAKOO 5 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.

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 induces 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 possible incidents 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 the reaction to an incident 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 incidents in real flight, so you can deal with these situations as safely as possible.

Asymmetric collapse
In spite of the TAKOO 5's profile stability, strong turbulent air may cause the wing to collapse asymmetrically, especially 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 TAKOO 5 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 TAKOO 5 '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 TAKOO 5'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 TAKOO 5.
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 TAKOO 5 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 3STI 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 C-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 TAKOO 5 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 GLIDER NAME's profile was designed for stable flight throughout its entire speed range. The speed-bar can be used 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 TAKOO 5's brake lines become disabled in flight, it will become necessary to pilot the wing with the D-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 D-risers will have to be pulled symmetrically all the way down 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 FLIG

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 EAR LOCK SYSTEM

Big ears is a moderate descent technique, with a normal descent rate of -3 a -4 m/s.
The angle of attack and effective wing-loading will also increase due to the smaller surface area of the wing. When ears are applied the ground speed will be reduced by 3 to 5 km/h and in order to maintain this descent technique, the pilot must physically hold in the ears.
On a solo glider, it is only possible to steer using weight-shift once ears have been pulled. On a tandem wing, although it is possible to steer with the help of the passenger, in most cases, when required,
this is insufficient. For this reason NIVIUK have improved the EAR LOCK SYSTEM, which we already used in the first TAKOO.

The TAKOO 5 comes with the EAR LOCK SYSTEM (ELS) as standard.
In a simple and effective way, this improved system for pulling big ears assists the tandem pilot when performing this descent technique. This innovation makes pulling or releasing ears simple, fast and easy.

ELS enables the pilot to pull and release the ears as desired.
ELS gives full steering control to the pilot with the ears applied.
ELS lets the pilot use the ears as long as necessary with no physical effort at all.
ELSallows the pilot to use the trimmers without concern or restriction.
ELS locks in the ears and prevents accidental opening.
ELS does not impede the conventional application of ears.

The ELS system can easily be removed without affecting the rest of the equipment.

To use the EAR LOCK SYSTEM simply pull the ear lock line downward until the knot passes through the ELS (lock system); then move it slightly horizontally forward, locking the knot in the V groove. To release, pull the ear lock line down and release the knot from the V groove. Then guide it vertically as it goes upward and back through the ELS (Lock System) It is better to release the two ears separately (asymmetrically).

To perform big ears as a descent manoeuvre in the classic way, take the external A-line on both sides, as high as possible and pull them downward and outward. The wingtips will fold in. To release the ears, release the lines and they will reopen by without assistance. If this does not happen, brake progressively on one side and 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 carrying out this manoeuvre, the wing stops flying, loses all horizontal speed and the pilot is no longer in control of the paraglider.

The airflow over the profile is interrupted and the wing enters a situation similar to parachuting.

To enter this manoeuvre, the B-risers are gripped below the maillons and symmetrically pulled down together (approx. 20-30 cm) and maintained in that position.

Initiating the maneuver is physically demanding because it can take some strength to pull the risers down until the wing is deformed. After this, the physical effort is less. Continue to hold the risers in position. Once the wing is deformed, its horizontal speed will drop to 0 km/h; vertical descending speed increases to –6 to –8 m/s, depending on the conditions and how the manoeuvre is performed.

To exit the manoeuvre, simultaneously release both risers. The wing will then slightly surge forward and automatically return to normal flight. It is better to let go of the lines quickly rather than slowly.

This is an easy descent technique to perform, but remember that the wing will stop flying, will lose all forward horizontal speed, and its reactions will change markedly when compared to a normal flight configuration.

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 15m/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 TAKOO 5 does not experience any problem whilst being towed. Only qualified winch personnel should handle the certified equipment to carry out 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 alignment, 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

Although the TAKOO 5 was tested by expert acrobatic pilots in extreme situations, it was not designed for it. We do not recommend using this glider for acrobatic flying!!!

We consider acrobatic flights to be any form of piloting different than standard flights. Learning 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. Centrifugal forces as high as 4 to 5 g can be exerted on the body and wing during extreme manoeuvres.

7. CARE AND MAINTENANCE

7.1 MAINTENANCE

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.

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.

All incidents involving the leading edge should be reviewed. A hard impact of the leading edge against a hard surface can damage the sail cloth.

Unsheathed lines provide increased performance, but this means more care should be taken when using and maintaining the wing.

Thanks to TNT, the wing has more safety and performance, but this means being more careful with the material. If any Nitinol rod is damaged, they are easily replaceable.

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 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 60ºC.

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

Inspections

The TAKOO 5 must be periodically serviced. An inspection must be scheduled every 100 flying hours or every two years whichever comes first (EN/LTF norm).

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 your TAKOO 5.

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

7.4 REPAIRS

In 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:
http://niviuk.com/content/service.
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 paramotor or trike 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.

Despite rigorous certification procedures and the fact that the materials used in its construction exceed required standards, do not hesitate to change your spreader bars, carabiners and safety elements every time you get a new model of the Takoo.

Due to frequent use, with numerous daily launches and landings, the materials used in tandem wings suffer greater wear and tear than those used in solo gliders.

Niviuk includes a set of spreader bars with every serial Takoo. It is very important to install this new set of spreaders with the harnesses normally used. Do not continue with your old spreader bars, just because they are already in use.

Do not forget to regularly check and replace carabiners and safety elements that are prone to impacts, wear and tear. Even if at first glance it may seem there are no issues, there may be internal damage in the form of micro cracks that significantly reduce their durability.

It is essential to carry out regular checks on all your tandem equipment to make sure you are flying in complete safety. Remember you are not flying alone.

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.

Cualquier modificación sobre el ala o sus componentes invalida garantía y homologación.
a)No son consideradas modificaciones el necesario trimaje del suspentaje, ni las reparaciones o cambio de suspentes. Siempre que sean realizados acordes a los parámetros establecidos por NIVIUK.

10. TECHNICAL DATA

10.1 TECHNICAL DATA

			39	42	44
CELLS	**Number**		54	54	54
ASPECT RATIO	**Flat**		5,5	5,5	5,5
AREA	**Flat**	m2	38	41	44
	Projected	m2	32,18	34,72	37,26
SPAN	**Flat**	m	14,46	15,02	15,56
CHORD	**Maximum**	m	3,29	3,41	3,54
LINES	**Total**	m	370	385	400
	Main		3/3/3/2	3/3/3/2	3/3/3/2
RISERS	**Number**	4	A/B/C/D	A/B/C/D	A/B/C/D
	Accelerator	mm	100	100	100
WEIGHT IN FLIGHT	**Min-Max**	Kg	110-190	120-220	140-239
GLIDER WEIGHT		Kg	7,14	7,51	8,06
CERTIFICATION	**EN/LTF**		B	B	B

10.2 MATERIALS DESCRIPTION

CANOPY	FABRIC CODE	SUPPLIER
UPPER SURFACE	30 DMF / N20 DMF	DOMINICO TEX CO (KOREA)
BOTTOM SURFACE	N20 DMF	DOMINICO TEX CO (KOREA)
PROFILES	30 DFM / 2044 32 FM	DOMINICO TEX CO (KOREA)
DIAGONALS	30 DFM / 2044 32 FM	DOMINICO TEX CO (KOREA)
LOOPS	LKI - 10	KOLON IND. (KOREA)
REIFORCEMENT LOOPS	W-420 / RIPSTOP FABRIC	D-P (GERMANY)
TRAILING EDGE REIFORCEMENT	MYLAR	D-P (GERMANY)
RIBS REIFORCEMNET	LTN-1/0.8 STICK	SPORTWARE CO.CHINA
THREAD	SERAFIL 60	AMAN (GERMANY)

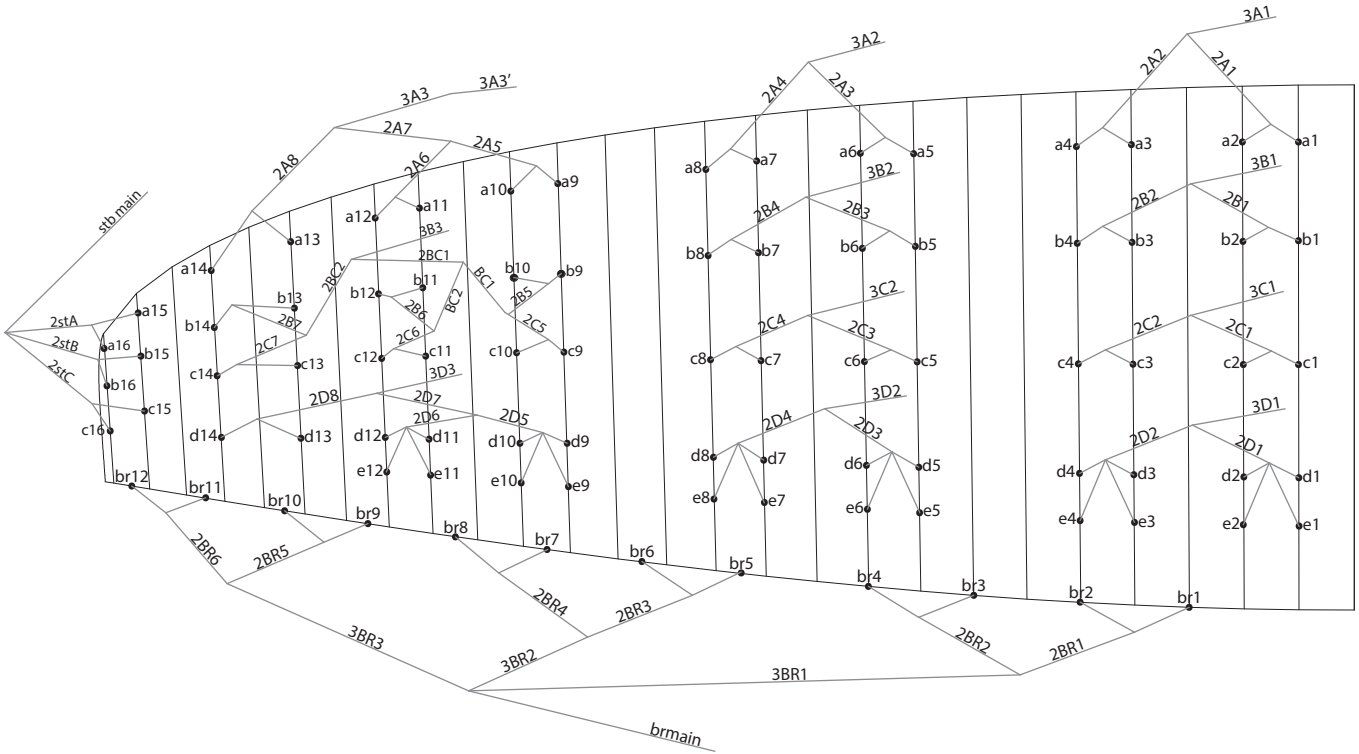
SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	MATRIX - 80	EDELRID (GERMANY)
UPPER CASCADES	PPSL - 120	LIROS GMHB (GERMANY)
MIDDLE CASCADES	PPSL - 120	LIROS GMHB (GERMANY)
MIDDLE CASCADES	PPSL - 200	LIROS GMHB (GERMANY)
MIDDLE CASCADES	TNL - 280	TEIJIM LIMITED (JAPAN)
MIDDLE CASCADES	MATRIX - 80	EDELRID (GERMANY)
MAIN	TNL - 140	TEIJIM LIMITED (JAPAN)
MAIN	TNL - 280	TEIJIM LIMITED (JAPAN)
MAIN	TNL - 400	TEIJIM LIMITED (JAPAN)
MAIN BREAK	TARAX-240	EDELRID (GERMANY)
THREAD	SERAFIL 60	AMAN (GERMANY)

RISERS	FABRIC CODE	SUPPLIER
MATERIAL	G-R 22	TECNI SANGLES (FRANCE)
COLOR INDICATOR	210D	TECNI SANGLES (FRANCE)
THREAD	V138	COATS (ENGLAND)
MAILLONS	MRI4	ANSUNG PRECISION (KOREA)
PULLEYS	RF25109	RONSTAN (AUSTRALIA)

10.3 RISERS PLAN

A	A'	B	C	D
3A1	3A3	3B1	3C1	3D1
3A2		3B2	3C2	3D2
		3B3	stab	3D3

10.4 SUSPENSION PLAN



10.5 DIMENSIONS TAKOO 5 39

LINES HEIGHT mm

	A	B	C	D	E	BR
1	8576	8494	8498	8650	8722	9029
2	8508	8420	8426	8556	8635	8805
3	8472	8382	8391	8511	8588	8629
4	8490	8405	8416	8558	8624	8629
5	8438	8352	8368	8496	8567	8373
6	8388	8298	8314	8421	8489	8192
7	8341	8256	8275	8373	8437	8131
8	8350	8272	8293	8414	8462	8247
9	8246	8206	8211	8310	8366	8105
10	8163	8127	8136	8209	8260	7976
11	8049	8015	8026	8090	8131	7925
12	8034	7998	8018	8083	8113	8044
13	7906	7877	7890	8018		
14	7844	7817	7843	8004		
15	7587	7540	7588			
16	7496	7491	7566			

RISERS LENGHT mm

	A	B	C	D	
	350	350	350	350	STANDARD
	350	375	400	450	ACCELERATED

10.6 DIMENSIONS TAKOO 5 42

LINES HEIGHT mm

	A	B	C	D	E	BR
1	8913	8824	8826	8987	9061	9405
2	8843	8748	8752	8890	8971	9174
3	8808	8710	8716	8843	8923	8991
4	8827	8735	8742	8892	8961	8992
5	8774	8683	8700	8831	8905	8725
6	8722	8627	8645	8754	8825	8538
7	8675	8585	8605	8706	8771	8476
8	8685	8602	8624	8748	8798	8597
9	8574	8538	8544	8641	8699	8451
10	8487	8456	8467	8537	8590	8317
11	8369	8341	8353	8414	8457	8265
12	8354	8324	8345	8407	8438	8391
13	8222	8189	8204	8335		
14	8158	8127	8156	8320		
15	7891	7843	7894			
16	7797	7793	7870			

RISERS LENGHT mm

	A	B	C	D	
	350	350	350	350	STANDARD
	350	375	400	450	ACCELERATED

10.7 DIMENSIONS TAKOO 5 44

LINES HEIGHT mm

	A	B	C	D	E	BR
1	9233	9145	9146	9308	9385	9756
2	9157	9067	9070	9208	9293	9517
3	9121	9028	9035	9162	9244	9328
4	9142	9054	9062	9213	9285	9330
5	9089	9003	9014	9150	9227	9054
6	9036	8945	8958	9071	9145	8861
7	8987	8903	8917	9022	9090	8799
8	8998	8921	8937	9066	9118	8925
9	8878	8847	8847	8957	9017	8773
10	8788	8762	8767	8849	8903	8635
11	8666	8642	8650	8722	8766	8582
12	8651	8625	8642	8715	8747	8715
13	8513	8494	8505	8651		
14	8448	8431	8455	8636		
15	8181	8130	8183			
16	8083	8078	8159			

RISERS LENGHT mm

	A	B	C	D	
	350	350	350	350	STANDARD
	350	375	400	450	ACCELERATED

10.10 CERTIFICATION SPECIMEN TEST

TAKOO 5 39

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 ▲ CH-1844 Villeneuve ▲ +41 (0)21 965 65 65
Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1744.2020
Date of issue (DMY):	01.12.2020
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Takoo 5 39
Serial number:	TAKOO5338

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**190**	Range of speed system (cm)	**0**
Minimum weight in flight (kg)	**110**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**7.14**	Total speed range with accessories (km/h)	**21**
Number of risers	**4**	Range of trimmers (cm)	**10.1**
Projected area (m2)	**32.18**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 100 hours of use or every 24 months
Harness brand	**Advance**	Warning! Before use refer to user's manual
Harness model	**Bi pro 2**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**55**	
Distance between risers (cm)	**55**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	**A**	**B**	**A**	**0**	**0**	**A**	**A**	**B**	**B**	**A**	**A**	**B**	**B**	**A**	**A**	**A**	**A**	**A**	**B**	**0**	**A**	**0**

TAKOO 5 42

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 ▲ CH-1844 Villeneuve ▲ +41 (0)21 965 65 65
Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1735.2020
Date of issue (DMY):	30.11.-0001
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Takoo 5 42
Serial number:	TAKOO5341

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**220**	Range of speed system (cm)	**0**
Minimum weight in flight (kg)	**120**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**7.5**	Total speed range with accessories (km/h)	**21**
Number of risers	**4**	Range of trimmers (cm)	**10.4**
Projected area (m2)	**34.72**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 100 hours of use or every 24 months
Harness brand	**Advance**	Warning! Before use refer to user's manual
Harness model	**Bi pro 2**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**55**	
Distance between risers (cm)	**55**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	**A**	**B**	**A**	**0**	**0**	**A**	**A**	**A**	**B**	**A**	**A**	**B**	**B**	**A**	**A**	**A**	**A**	**A**	**B**	**0**	**A**	**0**

10.10 CERTIFICATION SPECIMEN TEST

TAKOO 5 44

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 • CH-1844 Villeneuve • +41 (0)21 965 65 65

Test laboratory for paragliders, paraglider harnesses and paraglider reserve parachutes

paragliding by air turquoise

Classification: **B**

NIVIUK

In accordance with standards EN 926-1:2015, EN 926-2:2013 and LTF NFL II-91/09:	PG_1745.2020
Date of issue (DMY):	02.12.2020
Manufacturer:	Niviuk Gliders / Air Games S.L.
Model:	Takoo 5 44
Serial number:	TAKOO5344

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**239**	Range of speed system (cm)	**0**
Minimum weight in flight (kg)	**140**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**8.06**	Total speed range with accessories (km/h)	**21**
Number of risers	**4**	Range of trimmers (cm)	**10.5**
Projected area (m2)	**37.26**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 100 hours of use or every 24 months
Harness brand	**Advance**	Warning! Before use refer to user's manual
Harness model	**Bi pro 2**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**55**	
Distance between risers (cm)	**55**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	**A**	**B**	**A**	**0**	**0**	**A**	**A**	**B**	**B**	**B**	**A**	**B**	**B**	**A**	**A**	**A**	**A**	**0**	**A**	**A**	**A**	**0**

NIVIUK