

# **USER'S MANUAL DOBERMANN 2**



## DOBERMANN 2

Get set, go!

### WELCOME

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 Niviuk R&D team's commitment, passion and excitement, which resulted in the creation of the new DOBERMANN 2. Our company is proud of this new carefully designed glider, bringing maximum pleasure during a pilot's progression.

The DOBERMANN 2 is faster, steadier and better in turns than its predecessor. Furthermore, it also provides excellent glide, more stability and manoeuvrability.

Speed, efficiency and security in PPG. Discover the new DOBERMANN 2 and master the challenge of races, slalom courses and aerobatics.

We are confident that you will enjoy flying this wing and will soon understand the meaning of our motto: 'The importance of small details'.

This is the user manual. We recommend you read it before your first flight with the wing.

The **NIVIUK** Team.

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## USER'S MANUAL

### NIVIUK GLIDERS DOBERMANN 2

This manual includes all the necessary information pertaining to the DOBERMANN 2's characteristics, but it cannot be viewed as an instructional handbook and does not offer the instruction required to pilot this type of wing. Training can only be obtained at a certified paragliding school.

Please review and read the comprehensive content of the DOBERMANN 2 manual.

Misuse of this equipment could lead to severe injuries or death.

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## 1. CHARACTERISTICS

### 1.1 WHO IS IT DESIGNED FOR?

Targeted at experienced paramotor pilots with extensive flying experience and proven skills, who wish to have a very fast and accurate wing for slalom, classical or freestyle competitions or for recreational flights, who do not wish to sacrifice comfort and safety.

Paramotoring is a relatively new discipline and it is continuously evolving. To get the most out of the wing, it is essential that the motor set-up, propeller, harness and pilot experience are compatible.

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

### 1.2 CERTIFICATION

The DOBERMANN 2 complies with the requirements of EN 926-1. The load and traction tests were conducted by the Air Turquoise testing centre in Switzerland.

Shock test to 1.200 kg.

Load test to 8G 148 kg.

Load test (calculated by DGAC) to 5.25G 225 kg.

Load test report EN 926-1:2015 & LTF NFL 91/09 chapter 3.

It has passed the Dirección General Aviación Civil (DGAC) certification as ULM class 1. It also has the manufacturer's certification.

Any modification of the paraglider invalidates the certification. Note that each wing size can behave differently during the same manoeuvre depending on its all-up weight.

### 1.3 IN-FLIGHT BEHAVIOUR

Niviuk developed the DOBERMANN 2 by adopting very specific guidelines: the objective was to seek utmost performance: faster, steadier and better in turns. Better feel for the wing and easier piloting.

The glider profile was optimised to provide feedback in a very understandable and convenient way, helping the pilot concentrate on the feel of the wing and their technique.

In all aspects of flight the profile is very solid, smooth in glide, during acceleration, deceleration, turns and counter-turns. When accelerating, the wing augments the engine power. Whether accelerating from fast to very fast, from acceleration to turn, turn to turn, turning to acceleration, the wing remains compact and stable. The high-speed tip improves the turn precision and is therefore less physical and provides better feedback. Inflating the wing is much easier and gentler without overshooting.

### PLEASE NOTE!

For high-speed flying, it is very important to become familiar with the correct use of the main steering elements: the trimmers, accelerator (DES), High-speed tip steering and the main brakes. At high speeds any action is immediately implemented and if the decision is incorrect, this can have grave consequences for the pilot.

We recommend paying particular attention and concentration when using these steering elements. See also the section on the Double Steering System.

### 1.4 ASSEMBLY, MATERIALS

The DOBERMANN 2 has all the technological innovations used on other Niviuk gliders which are designed to enhance the pilot's comfort and to improve the performance of the wing.

**Titanium Technology (TNT)** - A revolutionary technique using Nitinol,

developed to build the internal structure of the glider, brings a more uniform profile, and hence reduces the overall wing weight to gain efficiency in flight. The Nitinol provides the highest level of protection against deformation, heat or breaks. Using this technological advance, the glider is able to maintain its original features for a longer period of time.

**Double Effect System (DES)** .- With the implementation of the DES, pilots can make the most out of the glider's ability to perform to its full potential using the speed bar. The DES keeps the trimmers in the default closed position (the slowest) and will open them when accelerating during the flight. When the speed-bar is released the DES brings the profile back to the neutral and default position.

**Structured Leading Edge (SLE)** .- The use of the SLE allows reinforcement of the leading edge, preventing any deformation in turbulence. The airflow is also vastly improved over the entire leading edge of the glider.

**Reflex System Profile (RSP)** .- Unlike conventional reflex designs, the highly efficient Reflex System Profile requires less engine power to achieve greater thrust, thus resulting in lower fuel consumption, more autonomy and higher overall motor efficiency. The RSP profile improves gliding, speed and safety.

**3D Leading Edge (3DL)** .- Adding an extra seam to the longitudinal axis of the glider helps building a cleaner profile with fewer creases and better load distribution.

**3D Pattern Cut Optimisation (3DP)** .- Cutting the fabric in a specific directional angle according to each panel's final location and positioning results in a crease-free surface with better fabric tension.

**RAM Air Intake (RAM)** .- The RAM Air Intake system is characterised by the arrangement of the air inlets, to ensure optimal maintenance

of internal pressure. Thanks to this design, we were able to reduce their size, while maintaining the same air flow at all angles to improve laminar flow. Having greater internal pressure means better absorption of turbulence, greater consistency of the profile 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 stability.

Double Steering System or High-speed tip steering is a simple and effective tool for the pilot to turn effortlessly without touching the brake, effectively preventing deformation of the profile and therefore preventing a decrease in performance and speed.

From Olivier Nef's computer to fabric cutting, the operation is a Zero 6 tolerance process. An automated computer laser-cutting robotic arm creates each of the many sections needed to complete the wing assembly. This program also paints the guideline markers and numbers on each individual fabric piece.

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 fabric used to manufacture the glider is light, resistant and durable and there will be no colour loss.

The DOBERMANN 2's line cascade layout uses an analysed combination of Dyneema and Vectram in order to support the load, depending on the location of the line area.

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 wing is then individually inflated for the last visual inspection.

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

Niviuk gliders are made of premium materials. Information about the various materials used to manufacture the wing can be viewed on the final pages of this manual.

## 1.5 ELEMENTS, COMPONENTS

The DOBERMANN 2 is delivered with a series of accessories that, although not fundamental, are important in the use, transport and storage of the paraglider.

- The Koli Bag, ideal for packing all the equipment.
- An inner bag making the glider folding process easier.
- An adjustable folding strap for quick and easy packing.
- A small fabric repair kit with self-adhesive ripstop nylon (matching the wing's colour scheme) and replacement O-rings.

## 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 DOBERMANN 2.

We recommend that a qualified instructor is present to supervise the entire procedure, as only they can resolve 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 facing the sky. Lay out the wing in a crescent shape with the cells openings pointing into wind, as if you were to inflate it.

Check the condition of the fabric and the lines for defects. Pay attention to the maillons connecting the lines to the risers to make sure they are fully closed and tightened. Identify, and if necessary untangle, the A, B, C and D-lines, the brake lines and corresponding risers. Make sure that there are no knots.

### 2.3 CONNECTING THE MOTOR

Correctly connect the risers to the harness' carabiners. The risers and lines must not have any twists and must be in the right order. Check that the harness buckles are properly fastened and securely locked.

Check the paramotor manufacturer's specification on attachment points.

### 2.4 HARNESS TYPE

The DOBERMANN 2 can be flown with most harnesses on the market.

The distance/comfort bar will determine the distance between the carabiners. Incorrect chest strap adjustments can affect glider/harness behaviour and thus glider handling. Too wide a distance between the carabiners will provide greater feedback from the wing, but less glider stability. Too narrow a distance will not provide as much feedback, as well as increasing the risk of experiencing a riser twist during a collapse.

### 2.5 SPEED SYSTEM ASSEMBLY

The speed system of the DOBERMANN 2 works when you push with

your feet on the accelerator bar/speed-bar, which is NOT supplied with the equipment.

Most harnesses are equipped with a pre-installed speed system. Before first use, ensure that all the harness' pre-installed components, such as the pulleys, are installed correctly. After fitting, take into account that you will have to adjust the length of the speed-bar lines for your individual requirements. This will vary according to the length of each pilots' legs!

### **PLEASE NOTE!**

Please ensure you carefully read the sections on trimmers and the Double Effect System (DES).

We recommend testing the accelerator system when hanging in a frame first - most schools have such equipment. If in doubt, seek advice from a qualified professional dealer or school.

## 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 DOBERMANN 2 as many times as necessary to familiarise yourself with its behaviour. The DOBERMANN 2 inflates easily and smoothly. An excess of energy is not necessary and the wing will inflate with minimum pressure on the harness when you move forward. 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 in the 12 o'clock position, simply apply the correct pressure on the brake lines and the DOBERMANN 2 will sit over your head.

## 2.7 ADJUSTING THE BRAKES – DOUBLE STEERING SYSTEM

The length of the main brake lines is adjusted at the factory. However, it

can be changed to adapt to the pilot's own flying style. In any case, we recommend flying for a while using the default line length factory settings before making any adjustment. It will enable you to become more familiar with the DOBERMANN 2 and its unique flying characteristics. If you then decide to change the length of the brake lines, untie the knot, slide the line through the brake link 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 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.

When changing the brake length, it is necessary to check that they do not engage when the speed-bar is used. When we accelerate, the glider rotates over the C riser and the trailing edge elevates. We must check that the brake is adjusted to take into consideration this extra distance during acceleration.

### **PLEASE NOTE!**

The main brakes and the high speed tip are connected at the same point. Special care must be taken when adjusting the brakes or the high speed tip. Frequently, pilots decide to adjust the two differently. Please see the section on: Using the high speed tip

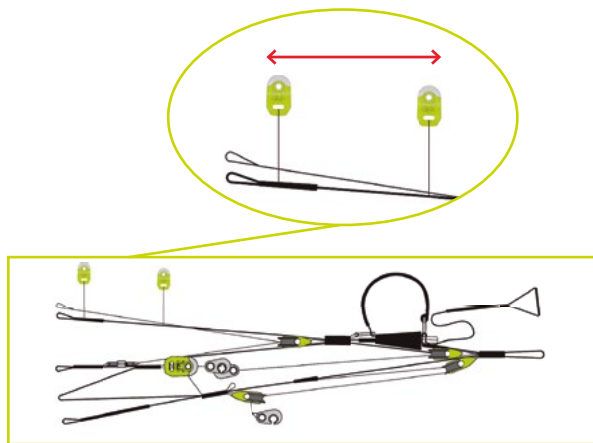
## 2.7.1 ADJUSTING THE BRAKE PULLEY

Because of the different harness heights that engine manufacturers use, the DOBERMANN 2 has the possibility of moving the brake pulleys, depending on the height of the harness or just for pilot convenience.

The pulley is fastened to the riser using velcro and can be adjusted easily. The riser has 4 possible fixing points (distributed along 10 cm) to accommodate the pulley.

### **PLEASE NOTE!**

Only the brake line should pass through the pulley – never the high speed tip.



### 3. THE FIRST FLIGHT

#### 3.1 CHOOSE THE RIGHT LOCATION

The first flights with the DOBERMANN 2 should be made in low wind speeds, on a training hill or obstacle free area. We recommend that a qualified instructor is present and supervising the entire procedure.

#### 3.2 PREPARATION

Repeat the procedures detailed in chapter 2 UNPACKING AND ASSEMBLY 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 for your flying skill level.

#### 3.5 WING INFLATION, CONTROL AND TAKE-OFF

Smoothly and progressively inflate the wing (see chapter 2.6 INSPECTION AND WING INFLATION ON THE GROUND). The DOBERMANN 2 comes up easily, without excessive energy and does not overfly the pilot. It is a straight forward exercise leaving enough time for the pilot to decide whether to run and take off or not.

Whenever the wind speed permits, we recommend using a reverse launch technique, as it is more conducive to carrying out a better visual check of the wing. The DOBERMANN 2 is especially easy to control during reverse inflations in windier conditions. However, wind speeds up to 25 to 30 km/h are considered strong and extra consideration should be given as whether or not to fly.

Setting up the wing on the ground before takeoff 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 DOBERMANN 2 lands excellently, it transforms the wing speed into lift at the pilot's demand, allowing an enormous margin of error. You will not have to wrap the brake lines around your hand to get greater braking efficiency.

### 3.7 FOLDING INSTRUCTIONS

The DOBERMANN 2 has a complex leading and trailing edge, manufactured using a variety of different materials. 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 Nitinol 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.

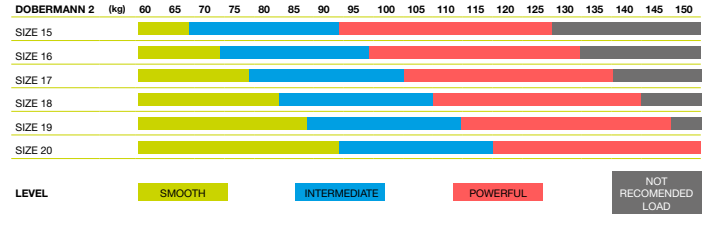
The wing should then be folded in three parts without excessive compression; the contrary could lead to material and/or the line damage.

The NKare bag is an easy to use folding bag designed to help with the packing process. It can also be used as a surface base to protect the glider against damage.

## 4. IN FLIGHT

Note that glider behaviour can vary, depending on size or wing loading for the same size.

The performance and speed of the DOBERMAN 2 depend directly on the engine power, the use of DES and wing loading.



With the RSP (Reflex System Profile) the engine does not need much power to achieve a greater thrust, resulting in less consumption, more autonomy, less need for power, durability, mechanical efficiency and increased performance.

However, in order to get the maximum power out of this wing, we will need an engine that is able to push a highly loaded wing. Without the right wing loading and without the required power, the wing will not operate to its full potential.

Please remember! The DOBERMANN 2 is a competition wing with a DNA capable of great feats but it must be handled correctly or it may cause serious problems for the pilot.

### 4.1 DES (Double Effect System)

Pilots who fly the DOBERMANN 2 must realise that this wing was designed as a competition wing. All its elements have been designed for speed and to stay at the front of the competition. The wing can be used for recreational flights, but the pilot must be aware of the potential of this wing and adjust their flying style accordingly. Because the wing can fly at great speeds, the pilot must make quick and assertive decisions.

The DOBERMANN 2 is delivered with the DES (Double Effect System)

already installed.

The system should only be used by very experienced pilots.

Using this technology without sufficient skill and experience carries great risk to the pilot. Its use near terrain requires great skill and can leave the pilot with very little room for manoeuvre in the event of an incident.

In a slalom competition, the pilot needs to enter the circuit with maximum speed, then reduce speed quickly, while initiating the turn to round the pylon and set the course to the next turning point, accelerating again to full speed. All this in just a few seconds!

The pilot must also manipulate the throttle, trimmers, gas and control the rotation – this required a solution that would allow the pilot to act quickly and effectively. The DES was designed to fulfil this requirement.

The DES provides an alternative, allowing the pilot to accelerate to 100%, reduce speed and return to 100% in the shortest possible time, in a single movement.

The DES interactively connects the throttle with the trimmer, allowing acceleration and the opening of the trimmers in one movement of one leg while the hands are free for the throttle and turning system (see High-speed tip steering).

With the DES, the pilot has available an accelerator which can unleash the full power of the wing, and they can utilise accurately and quickly the speed that is required at all times. The DES means the wing launches with the neutral (slowest) setting and as it accelerates, it releases the trimmers. At its peak, the pilot can use 100% accelerator and 100% of the trimmers with the wing working with the reflex to 100%. When you release the accelerator, the DES is responsible for returning the profile to neutral.

The pilot can adjust the amount of trimmer to be released, even during flight. It is not always necessary to accelerate to 100% and open the trimmers 100%. The pilot can choose the proportion of trimmer to use. Given that only when the accelerator is at 100%, the trimmer will be opened to the maximum.

With the DES installed, the classic trimmer function is cancelled as this is subordinate to the accelerator.

The pilot can leave the trim in neutral and only use the accelerator.

#### **PLEASE NOTE!**

We recommend you do not disable the DES. The DOBERMANN 2 is designed to fly with the DES installed. It is possible to disable the DES but in this case, the pilot must not engage the trimmers in flight. The standard trimmers will not function without the DES.

#### **PLEASE NOTE!**

With 100% accelerator and 100% trimmers we recommend not using the brakes as this makes the wing more prone to collapses.

It is of utmost importance that the pre-flight check routine includes checking that the DES link is connected to the two bands. Also that the trimmers are set symmetrically.

### **4.2 DOUBLE STEERING SYSTEM**

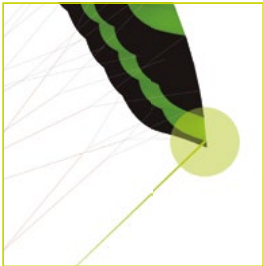
In increase the turning efficiency, the DOBERMANN 2 is fitted with the Double Steering System.

The DOBERMANN 2 has two brake lines: the main brake and the high speed tip. The high-speed tip gives the pilot the ability to turn without pulling the brakes, thus avoiding deforming the profile and therefore preventing a decrease in performance and speed.



The DOBERMANN 2's high-speed tip is a simple and effective tool. It is a single line from the riser to a critical point of the wingtip. This critical location ensures that, when using the high-speed tip, creases will not appear and the trailing edge or the reflex is not engaged, which might compromise the safety and performance of the wing.

With this new high-speed tip, the pilot is able to round a pylon at speeds up to 60 km/h (without spinning).



The DOBERMANN 2 is delivered with the factory set brake and high-speed tip as standard. The pilot can adjust the brake travel as required. Instructions for use: the main brake acts and handles like any brake.

When the pilot decides to use the high speed tip they must move the main brake from the neutral position (without the brake pulled) and make a HORIZONTAL movement to the opposite direction of rotation. In this way the profile does not lose its effectiveness and the turn is more inclined.

Thanks to the Double Steering System a single command allows the pilot to expand the possibilities of turning without losing control over the brakes.

Brakes: vertical movements.

High-speed tip: horizontal movements.

The amplitude of these movements is at the discretion of the pilot. Depending on the requirements of the pilot, it is also possible to have a more precise adjustment of the length of the brake and high-speed tip.

The correct use of the high-speed tip in conjunction with the DES (turn and acceleration) must be practised by the pilot until they have fully mastered these controls. This experience is needed in many manoeuvres the pilot wants to perform but it requires a lot of practise and a good glider control skills.

### PLEASE NOTE!

It is possible to use the high-speed tip during acceleration. We recommend NOT using the brakes during acceleration.

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

### Asymmetrical collapse

In spite of the DOBERMANN 2's profile stability, strong turbulent air may cause the wing to collapse asymmetrically if the pilot is unable to predict the glider's reactions in specific circumstances. When the wing is

about to experience an asymmetric collapse, the brake lines will slacken and transmit a tension loss affecting the harness stability. To prevent the collapse from happening, pull the brake handle corresponding to the affected side of the wing. It will increase the incidence of the wing (angle of attack). If the collapse does happen, the DOBERMANN 2 will not react violently, the turning tendency is gradual and easily controlled. Weight-shift toward the flying and opposite side of the collapse to keep the wing flying straight while applying a light brake pressure to that side if necessary, to slow it down. The collapsed side of the wing should then recover and reopen by itself. If it does not, then pull the brake toggle on the collapsed side decisively and quickly all the way down before bringing it back up immediately. You may have to repeat this pumping action to provoke the re-opening of the deflated glider side. Do not over-brake or slow down the flying side of the wing (this causes the risk of a stall due having too high an angle of attack). Once the collapsed side is open, re-centre your body under the wing to regain the default flying speed.

### **Frontal collapse**

A normal flying conditions and due to the DOBERMANN 2's design, 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 or when lacking experience using the accelerator/speed-bar with mistimed, inadequate input. Frontal collapses usually re-inflate without the glider turning, but a symmetrically applied quick braking action with a quick deep pump 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 DOBERMANN 2's normal flight behaviour. Certain circumstances however, may provoke this configuration (such as trying to turn when flying at very low air speed whilst applying a lot of brake, and applying even more brake pressure on one side). 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**

A parachutal stall takes place when the wing remains fully inflated but loses forward motion and then descends vertically at an accelerated rate. Instability and a lack of pressure on the brake lines sets in, although the canopy would appear to be correctly inflated. To regain normal air speed, release brake line tension symmetrically and push forward on the A-lines or weight-shift your body to any side **WITHOUT PULLING ON THE BRAKE LINES**.

### **Deep stall**

The possibility of the DOBERMANN 2 falling into this configuration 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 down until the stall point is reached and held there for a few seconds. The glider will first pitch rearward and then reposition itself overhead, rocking slightly, depending on how the manoeuvre was done. When entering a stall, remain clear-headed and ease off the brake lines until reaching the half-way point during the downward pulling motion. The wing will then surge violently forward and could reach a point below the horizontal line. 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 as the wing needs to accelerate to pull away from the stall configuration. If

you have to control a possible symmetrical front stall (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 asymmetrical 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 asymmetrical collapse: control the turn/spin by applying tension on the opposite brake and weight shift opposite to the turn. Then locate the stabilo line trapped between the other lines. This line has a different colour and belongs to the external lines of the C riser.

Pull on this line until it is taught, as it should help undo the cravat. If ineffective, fly down to the nearest possible landing spot, control the trajectory 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 and collision could happen as result.

### **Over-controlling**

Most flying problems are caused by wrong pilot input, which then degenerates into a cascade of unwanted and unpredicted series of incidents. The DOBERMANN 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 follow 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 after any type of incident.

### **4.3 USING THE SPEED-BAR**

The DOBERMANN 2 profile was designed for stable flight throughout its

entire speed range.

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 incidence.

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 DOBERMANN 2's brake lines become disabled in flight, piloting the wing with the D-risers and weight shifting will become necessary. The D-lines steer easily because they are not under much tension, however you will need 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 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 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 running 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 of the wing 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. 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 trying to remove a knot, make sure there are no pilots flying nearby, and never try these attempts close to obstacles. If the knot is too tight and cannot be undone, carefully and safely fly to the nearest landing zone.

## 5. LOSING HEIGHT

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

It is well advised to learn the particularities of these manoeuvres under the supervision of a knowledgeable certified instructor.

### 5.1 EARS

Big ears is a moderate descent technique, able to increase the sink rate to  $-3$  or  $-4$  m/s, and reduce the ground speed down to 3 to 5 km/h. Effective piloting then becomes limited. The angle of attack and load will also increase due to the smaller surface area of the wing. Pushing on the accelerator/speed-bar will partially restore the wing's horizontal speed and angle of attack.

To activate the 'Big ears' manoeuvre, take the outer 3A3 line on each A-riser and simultaneously, smoothly pull them outward and downward. The wingtips will fold in. Let go of the risers to reinflate them automatically. If they do not re-inflate, gently pull on one of the brake lines and then on the opposite one. We recommend inflating the wing

tips asymmetrically, without altering the angle of incidence, especially when flying near the ground or flying in turbulence.

### 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) which means that you will have to pull strongly until the profile of the wing is deformed, when this happens the required force will be significantly reduced. To maintain this manoeuvre you must continue to hold the B-risers in the pulled down position. The wing will then deform, its horizontal speed will drop to 0 km/h; vertical descending speed increases to  $-6$  to  $-8$  m/s, depending on the weather 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, a pilot 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 equivalency 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. 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 with moderation.

#### 5.4 SLOW DESCENT TECHNIQUE

This technique allows descent without straining the wing or taxing the pilot. Glide normally while searching for descending (katabatic) air and begin to turn as if climbing in a thermal. Beware of potentially dangerous areas and locate a suitable LZ (landing zone) while descending. Safety comes first!

### 6. SPECIAL METHODS

#### 6.1 TOWING

The DOBERMANN 2 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 mountain or ridge takeoff.

#### 6.2 ACROBATIC FLIGHT

Although the DOBERMANN 2 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 soaring 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. Forces as high as 4 to 5 G can be exerted on a paragliding wings during extreme manoeuvres.

Materials will wear more quickly than in normal flight. Gliders subjected to extreme manoeuvre techniques should be inspected every six months.

### 7. CARE AND MAINTENANCE

#### 7.1 MAINTENANCE

Careful maintenance of your equipment will ensure continued top performance.

The fabric and the lines do not need to be washed. If they become dirty, clean them with a soft damp cloth.

If your wing is wet from contact with salt water, immerse it in fresh water and dry 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 flying in a sandy environment, and sand has accumulated inside the wing, remove it before packing it away.

## 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 and UV rays. Do not leave the gear inside a car boot, as temperatures can climb up to 60°C and damage it. Weight should not be laid on top of the equipment.

If the flight gear is stored with organic material, such as leaves, grass or insects trapped inside the cells, the chemical reaction can cause irreparable damage. Empty the cells before packing the glider away and never stow a glider when wet.

## 7.3 CHECKS AND CONTROLS

The DOBERMANN 2 must be periodically serviced. An inspection must be scheduled every 100 flying hours or every 24 months whichever comes first (EN/LTF norm).

Always conduct a thorough pre-flight check before each takeoff.

If the wing is damaged, you can temporarily repair it by using the ripstop material included in the repair kit, as long as no stitching is required to mend the fabric.

Damaged lines must be repaired immediately. Please refer to the line plan at the end of this manual.

Any repair should be done in a specialist repair shop by qualified personnel. Niviuk can not be held responsible for any damage caused by incorrect repairs.

## 8. SAFETY AND RESPONSIBILITY

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

Wrong use of this equipment may cause severe 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.

## 9. GUARANTEE

The equipment and components are covered by a 2-year warranty against any manufacturing defect. The warranty does not cover misuse of the equipment.

### **DISCLAIMER:**

Paragliding is an activity requiring concentration, specific knowledge and sound judgment. Beware! Learn your skills under the supervision and guidance of a certified school. Take out personal insurance and become a licensed pilot. Be humble when evaluating your proficiency level in respect to weather conditions before deciding on whether or not to fly. Niviuk's liability coverage is for its product line only. Niviuk can not be held responsible for your actions. Fly at your own risk!



## 10. TECHNICAL DATA

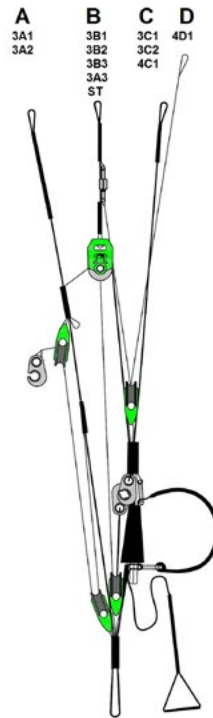
### 10.1 TECHNICAL DATA

<b>DOBERMANN 2</b>			<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
CELLS	NUMBER		60	60	60	60	60	60
	CLOSED		16	16	16	16	16	16
	BOX		23	23	23	23	23	23
FLAT	AREA	m <sup>2</sup>	14,5	16	17	18	19	20
	SPAN	m	9,25	9,72	10,02	10,31	10,59	10,86
	ASPECT RATIO		5,9	5,9	5,9	5,9	5,9	5,9
PROJECTED	AREA	m <sup>2</sup>	12,34	13,61	14,46	15,31	16,16	17,01
	SPAN	m	7,45	7,83	8,1	8,3	8,53	8,75
	ASPECT RATIO		4,5	4,5	4,5	4,5	4,5	4,5
FLATTENING		%	15	15	15	15	15	15
CORD	MAXIMUM	m	1,91	2,01	2,07	2,13	2,19	2,24
	MINIMUM	m	0,46	0,48	0,5	0,51	0,53	0,54
	AVERAGE	m	1,57	1,65	1,70	1,75	1,79	1,84
LINES	TOTAL METERS	m	257	271	280	289	297	305
	HEIGHT	m	5,72	6,01	6,19	6,37	6,55	6,72
	NUMBER		178	178	178	178	178	178
	MAIN		2+1/4/3/1	2+1/4/3/1	2+1/4/3/1	2+1/4/3/1	2+1/4/3/1	2+1/4/3/1
RISERS	NUMBER	4	A+A'/B/C/D	A+A'/B/C/D	A+A'/B/C/D	A+A'/B/C/D	A+A'/B/C/D	A+A'/B/C/D
	TRIMS	m/m	150	150	150	150	150	150
	ACCELERATOR	m/m	180	180	180	180	180	180
	COURSE CORRECTION		YES	YES	YES	YES	YES	YES
INTERMEDIATE WEIGHT	MINIMUM	kg	60	65	70	75	80	85
IN FLIGHT	MAXIMUM	kg	95	105	115	125	135	145
GLIDER WEIGHT		kg	3,8	4,1	4,3	4,5	4,65	4,8
CERTIFICATION	8G MAXIMUM 148 kg		EN 926-1	EN 926-1	EN 926-1	EN 926-1	EN 926-1	EN 926-1
	5,25G MAXIMUM 225 kg		DGAC	DGAC	DGAC	DGAC	DGAC	DGAC

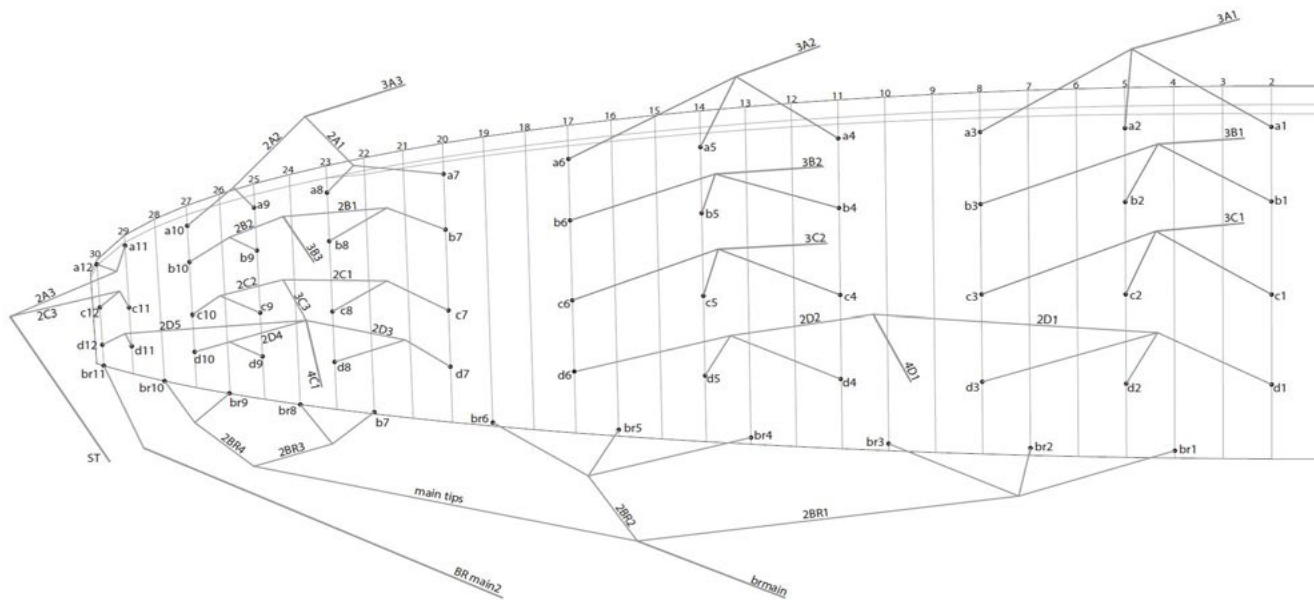
## 10.2 MATERIALS DESCRIPTION

<b>CANOPY</b>	<b>FABRIC CODE</b>	<b>SUPPLIER</b>
UPPER SURFACE	9017 E25	PORCHER IND (FRANCE)
BOTTOM SURFACE	N 20 DMF	DOMINICO TEX CO (KOREA)
PROFILES	9017 E29	PORCHER IND (FRANCE)
DIAGONALS	9017 E29	PORCHER IND (FRANCE)
LOOPS	LKI - 10	KOLON IND. (KOREA)
REINFORCEMENT LOOPS	W-420	D-P (GERMANY)
TRAILING EDGE REINFORCEMENT	MYLAR	D-P (GERMANY)
RIB REINFORCEMENT	LTN-0.8 STICK	SPORTWARE CO. (CHINA)
THREAD	SERAFIL 60	AMAN (GERMANY)
<b>SUSPENSION LINES</b>	<b>FABRIC CODE</b>	<b>SUPPLIER</b>
UPPER CASCADES	16330	COUSIN (FRANCE)
UPPER CASCADES	12240	COUSIN (FRANCE)
UPPER CASCADES	16140	COUSIN (FRANCE)
UPPER CASCADES	DC - 40	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 60	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 100	LIROS GMHB (GERMANY)
MIDDLE CASCADES	16330	COUSIN (FRANCE)
MIDDLE CASCADES	12240	COUSIN (FRANCE)
MIDDLE CASCADES	16140	COUSIN (FRANCE)
MIDDLE CASCADES	TNL - 80	TEIJIM LIMITED (JAPAN)
MAIN	12950	COUSIN (FRANCE)
MAIN	16560	COUSIN (FRANCE)
MAIN	16330	COUSIN (FRANCE)
MAIN	12240	COUSIN (FRANCE)
MAIN	12470	COUSIN (FRANCE)
MAIN BREAK	TNL - 280	TEIJIM LIMITED (JAPAN)
THREAD	SERAFIL 60	AMAN (GERMANY)
<b>RISERS</b>	<b>FABRIC CODE</b>	<b>SUPPLIER</b>
MATERIAL	WD103	COUSIN (FRANCE)
COLOR INDICATOR	PAD	TECNI SANGLES (FRANCE)
THREAD	V138	COATS (UNITED KINGDOM)
MAILLONS	MRI4	ANSUNG PRECISION (KOREA)
PULLEYS	RF25109	RONSTAN (AUSTRALIA)

### 10.3 RISERS LAYOUT



## 10.4 LINE PLAN



## 10.5 LENGTHS DOBERMANN 2 15

LINES HEIGHT m/m					
	A	B	C	D	br
1	5151	5101	5159	5378	5683
2	5073	5022	5070	5207	5538
3	5071	5020	5068	5166	5521
4	5033	4984	5025	5134	5415
5	4962	4917	4948	5112	5316
6	4940	4899	4932	5189	5293
7	4861	4830	4879	4927	5198
8	4749	4720	4740	4807	5119
9	4699	4676	4717	4746	5072
10	4692	4671	4749	4731	5095
11	4532		4521	4721	4563
12	4509		4496	4744	

RISERS LENGTH m/m					
	A	B	C	D	
	480	480	480	480	STANDARD
	480	530	580	670	ACCELERATED
	305	415	580	760	TRAVEL

## 10.6 LENGTHS DOBERMANN 2 16

LINES HEIGHT m/m					
	A	B	C	D	br
1	5435	5382	5443	5674	5991
2	5355	5301	5352	5496	5840
3	5355	5302	5351	5455	5823
4	5317	5265	5308	5422	5713
5	5242	5195	5228	5400	5609
6	5220	5177	5212	5480	5586
7	5137	5105	5156	5207	5488
8	5020	4990	5011	5082	5406
9	4968	4943	4987	5017	5358
10	4960	4938	5021	5002	5382
11	4792		4781	4992	4828
12	4768		4754	5016	

RISERS LENGTH m/m					
	A	B	C	D	
	480	480	480	480	STANDARD
	480	530	580	670	ACCELERATED
	305	415	580	760	TRAVEL

## 10.7 LENGTHS DOBERMANN 2 17

LINES HEIGHT m/m					
	A	B	C	D	br
1	5618	5563	5625	5864	6187
2	5536	5480	5532	5681	6032
3	5537	5482	5533	5640	6016
4	5498	5445	5489	5607	5904
5	5422	5373	5407	5584	5798
6	5400	5355	5392	5667	5775
7	5314	5281	5334	5386	5674
8	5193	5162	5185	5257	5590
9	5140	5114	5160	5191	5540
10	5132	5109	5195	5175	5565
11	4959		4947	5165	4998
12	4934		4920	5190	

RISERS LENGTH m/m				
A	B	C	D	
480	480	480	480	STANDARD
480	530	580	670	ACCELERATED
305	415	580	760	TRAVEL

## 10.8 LENGTHS DOBERMANN 2 18

LINES HEIGHT m/m					
	A	B	C	D	br
1	5795	5738	5802	6048	6378
2	5712	5654	5707	5861	6220
3	5714	5657	5709	5820	6204
4	5675	5620	5665	5787	6090
5	5597	5546	5581	5763	5981
6	5574	5529	5566	5848	5958
7	5486	5452	5507	5561	5856
8	5362	5330	5353	5428	5769
9	5307	5280	5328	5360	5718
10	5299	5275	5364	5343	5744
11	5121		5109	5333	5163
12	5095		5081	5359	

RISERS LENGTH m/m				
A	B	C	D	
480	480	480	480	STANDARD
480	530	580	670	ACCELERATED
305	415	580	760	TRAVEL

## 10.9 LENGTHS DOBERMANN 2 19

LINES HEIGHT m/m					
	A	B	C	D	br
1	5967	5909	5974	6227	6565
2	5883	5823	5877	6036	6403
3	5886	5827	5880	5995	6387
4	5846	5790	5836	5961	6271
5	5767	5715	5751	5937	6160
6	5744	5697	5736	6025	6137
7	5654	5619	5675	5730	6032
8	5526	5493	5517	5594	5943
9	5470	5442	5492	5524	5892
10	5461	5437	5529	5507	5919
11	5279		5266	5497	5323
12	5252		5237	5523	

RISERS LENGTH m/m				
A	B	C	D	
480	480	480	480	STANDARD
480	530	580	670	ACCELERATED
305	415	580	760	TRAVEL

## 10.10 LENGTHS DOBERMANN 2 20

LINES HEIGHT m/m					
	A	B	C	D	br
1	6135	6075	6141	6402	6746
2	6049	5988	6043	6206	6581
3	6053	5993	6047	6165	6565
4	6013	5955	6003	6131	6446
5	5932	5879	5916	6106	6334
6	5910	5861	5901	6197	6310
7	5817	5781	5839	5895	6203
8	5686	5652	5677	5756	6112
9	5628	5599	5651	5684	6059
10	5620	5594	5689	5667	6088
11	5433		5419	5656	5479
12	5405		5390	5683	

RISERS LENGTH m/m				
A	B	C	D	
480	480	480	480	STANDARD
480	530	580	670	ACCELERATED
305	415	580	760	TRAVEL

