

R-BUS 2

User *manual*



PIVIUK BEYOND
THE GLIDE

Great adventures *together*

WELCOME

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

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

The R-BUS 2 is Niviuk's tandem paramotor wing. It has the capacity to carry up to 600 kg, while maintaining performance with light loads. It is much more stable in flight, so that both pilot and passenger can enjoy an unforgettable experience. With an extended speed range, it allows launches and landings at lower speeds.

The highest performance comes from the incorporation of Niviuk technologies, which offer an unparalleled flight experience.

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.



CATEGORIES



TANDEM



PARAMOTOR

USER MANUAL

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

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 R-BUS 2 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.

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1. CHARACTERISTICS

1.1 WHO IS IT DESIGNED FOR?

Specially designed for motorised tandem flights, whether with a trike or on foot. The R-BUS 2 is a paramotor tandem designed to satisfy the most demanding pilots and for professional trike flights. Its durability and stability make it the best choice for professional flights.

It is also designed for recreational PPG dual flights, to enjoy tandem paramotoring in total comfort. This wing has been developed with the aim of adapting to the needs of the pilot and their passenger, and to experience the most pleasurable recreational flights.

It is a wing designed to provide absolute control for the pilot and to ensure that both pilot and passenger fully enjoy the flight experience.

Powered flight is a relatively new activity that is continually evolving. To get the most out of the glider it is essential that the whole flying package is right: engine, propeller, trike and pilot experience.

The rating of tandem pilots is the responsibility of the relevant aeronautical authorities.

1.2 CERTIFICATION

The R-BUS 2 has been submitted for, and meets all the requirements of the DGAC (The French Dirección General de Aviación Civil) and the EN-926-1 certification. All certification tests were performed at the Swiss testing house Air Turquoise.

- All sizes (31, 34, 37 and 40) passed the load, shock and flight tests.
- The shock test: 24000 N.
- The load test: 8G 396 kg.
- The load test at 5.25 g (DGAC) 600 kg.
- Certification number: 2022/010

It has the airworthiness certificate issued by the DGAC (the French Dirección General Aviación Civil) as ULM class 1. And the certificate issued by the manufacturer.

Any modification of the paraglider will invalidate this certification.

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.

1.3 IN-FLIGHT BEHAVIOUR

Niviuk developed this wing by adopting very specific goals: to offer the best possible features, excellent handling, to make flying easier for the pilot and passenger. In addition, the aim was to develop a tandem glider for powered flight capable of meeting the current needs of the majority of tandem pilots, both professional and recreational, who use a variety of launch techniques, from very heavy trikes to foot launching.


It is aimed at pilots who demand a wing with which to fly and enjoy real performance, capable of carrying up to 600 kilos, that is easy to take off and land, which does not require a lot of engine, that has high speed and good glide. This was a challenge that our R&D team was able to meet.

The R-Bus 2 has an extended speed range compared to its predecessor, thanks to an increased maximum speed (+3 km/h) and a decreased minimum speed (-5 km/h). This also reduces the distance needed for take off and landing, making the flight more comfortable and safer. Accessible, solid and agile, it inflates uniformly and takes up the weight quickly and progressively. It takes off easily, even in unfavourable conditions. Guaranteed efficiency from the first to the last moment.

The R-Bus 2 maintains glide efficiency, which helps reduce fuel consumption and gives the wing excellent speed and height retention for soft landings. In case of an engine failure, it is much safer due to its reduced sink rate (-2.5 m/s for a wing loading of 420 kg on a size 40 wing).

For increased pilot comfort, and thanks to the improved brake line cascade, manoeuvrability and handling have been made easier. The brake pressure when turning or landing has been reduced. In addition, to help reduce the effort required when using the brakes, the pilot can use only the High Speed Tip steering when manoeuvring, reserving the main brakes for launch and landing only.

The trimmer ensures that an appropriate cruise speed can be maintained according to the pilot's needs or wishes. The wing features excellent top and cruise speed. With the new, more effective and easier to use trimmers, the pilot can precisely control the course and speed, regardless of the weight they are carrying. The trimmer system has also been improved to be able to slow down for take offs and landings.

 PLEASE NOTE: It is very important to be familiar with the correct use of the main piloting elements: trimmer, High Speed Tip and the brakes. We recommend paying special attention to the use of these elements.



1.4 TECHNOLOGIES, ASSEMBLY, MATERIALS

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

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

RAM Air Intake – the system is based on the inward orientation of the air intakes at the cell openings so that they allow an optimum internal pressure at all angles of flight.

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

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

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

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

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

3D Leading Edge (3DL) – this means adjusting the material of the leading edge to avoid ballooning and the creases that form in this

curved area of the wing. Specifically, the leading edge is divided into “sub-panels” sewn into each of the cells at the front of the glider. As a result, the tension of the leading edge cloth is perfectly uniform, increasing the performance and durability of the glider.

Drag Reduction Structure (DRS) – the DRS aims to reduce the adverse pressure gradient and drag by optimising the aerodynamic shape of the wing. Its application makes the airflow direction much more progressive at the trailing edge. This increases performance without reducing safety and control of the wing.

Reflex System Profile (RSP) – the RSP is a profile morphologically designed to fit the technical characteristics of paramotor gliders. Solid in character, it provides greater pitch stability and more safety for the pilot, especially at high speeds.

Double Steering System (DSS) – high speed control handle. This is a simple and effective tool for the pilot to turn without effort and without touching the brake, thus avoiding deformations in the profile and, consequently, preventing a decrease in performance and speed.

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

In the construction process of the R-BUS 2 a reinforced internal structure has been used. More diagonals, lines, attachment points and reinforced seams to obtain a solid wing capable of carrying up to 600 kg.

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 experience fading and is covered by our warranty.

All lines are made from Technora with a Polyester sheath. Thanks to the use of the new TNL-500 lines, with an enlarged diameter of 2.45 mm

and a remodelled internal structure, it has been possible to increase the maximum wing load/strength. All lines are sheathed to increase the overall durability of the sail.

The line diameter has been calculated depending on the workload and aims to achieve the required best performance with the least drag. 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.

A new webbing material has been used for the risers, which is 26% stronger than the previous one.

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 R-BUS 2 is delivered with a series of accessories that will greatly assist in the maintenance of the paraglider:

- 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 parts to protect the maillons.
- An extra set of lines with an extra metre of main brake line and High Speed Tip to adjust them to the desired length. The pilot will have to change and adjust them according to their needs.
- A Koli bag – this is not included in the scope of the delivery, but its purchase is recommended. It facilitates transport of all the equipment comfortably and with plenty of space.
- A riser bag, which will prevent metal parts from coming into contact with the fabric during storage.

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 R-BUS 2.

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

2.2 PROCEDURE


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

Check that the timmers are in the correct position and are adjusted symmetrically.

2.3 CONNECTING THE TRIKE/PARAMOTOR


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

Check the engine manufacturer's specification on attachment points.

 PLEASE NOTE! Check that all the connections used (maillons, carabiners, quick-outs, etc.) are appropriate and certified to carry the all-up load.

2.4 HARNESS TYPE

When taking off on foot, the R-BUS 2 can be used with all current types of harness. When using the R-BUS 2 with a trike, the mounting instructions are determined by the manufacturer.

 PLEASE NOTE: The R-BUS 2 is not supplied with the necessary accessories for foot-launched tandem flights. These accessories (roll-bars, spreaders, extensions, etc.) are specific to each manufacturer. Whatever the type of accessory used, it is the tandem pilot's responsibility to use the accessories indicated by the manufacturer and to balance the weight properly before take off. We recommend testing and checking all equipment before each flight.

2.5 INSPECTION AND WING INFLATION ON THE GROUND

After your gear has been thoroughly checked and the weather conditions deemed favourable for flying, inflate your R-BUS 2 as many times as necessary to familiarise yourself with its behaviour.

The R-BUS 2 is a solid wing, but it is agile during inflation. The take off phase is surprisingly short and easy. The line distribution has been designed for an easy inflation, so that it climbs above the pilot's head quickly and precisely without a tendency to overshoot.

Foot-launch: the R-BUS 2 inflates easily and smoothly. Excessive energy is not necessary and the wing will inflate with a little pressure from the body 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.

2.5.1 A-ASSIST SYSTEM

Trike launch: the pilot can choose to perform a classic inflation, by pulling the A-risers (as you would when foot-launching) or by utilising the A-Assist system.



The system allows the pilot to link the A-risers through A-Assist "pulling risers" which are connected to the trike. With this system the pilot's hands are free to manipulate the brakes and the throttle and control the take off perfectly.

PLEASE NOTE! The A-Assist system must be installed and adjusted by the pilot. Once the launch sequence has been completed, the A-Assist must be free of any load or tension and with enough slack to allow normal pitching of the wing and the pendulum movement of the trike. We recommend the whole installation procedure is supervised by a qualified professional instructor or official dealer. Only they can address any doubts in a safe and professional way.

2.6 ADJUSTING THE BRAKES

The length of the main brake lines and the High Speed Tip are adjusted at the factory. However, they can be changed to suit the pilot's flying style or lengthened to accommodate the hang-points of the trike. In any case, we recommend flying for a while using the default factory set line length before making any adjustment. It will enable you to become more familiar with the R-BUS 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 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.

2.6.1 HIGH SPEED TIP

The High Speed Tip handle, which now has a rounded shape, is better positioned on the band, works with a magnet and is adjustable to the preferences of each pilot. The High Speed Tip is independent of the main brake and it improves turning by reducing the force required. Manoeuvrability is improved and the pilot has much more direct control at all times. To balance physical strength and reaction to inputs during a manoeuvre, the High Speed Tip can also be used together with the main brake.



2.7 ADJUSTING THE BRAKE PULLEY

Depending on the position of the pilot during the flight or the height of the trike hang points, the R-BUS 2 has the possibility of moving the brake pulleys to a variety of positions to ensure pilot comfort.

For ease of operation, the three-position adjustable brake pulley allows the brake to be adjusted to suit each pilot and flying equipment. The R-BUS 2 is delivered with an extra set of lines with an extra metre of main brake line length and High Speed Tip to adjust them to the desired length.

The brake pulley is attached to the riser with easily removable tape. The riser has 3 possible attachment points distributed along its entire length:

- 2 positions for low attachment at the top of the D-riser.
- 1 position for high attachment at the bottom of the A-riser.



2.8 USING THE TRIMMERS

The R-Bus 2 does not have a speed-bar, although that does not prevent it reaching a high cruising speed. The R-Bus 2 has an extended speed range compared to its predecessor, thanks to an increased maximum speed (+3 km/h) and a decreased minimum speed (-5 km/h). This also reduces the distance needed for take off and landing, making the flight more comfortable and safer.

Equipped with a highly efficient Reflex System Profile (RSP), the R-BUS 2 offers excellent top and cruising speed. With the new, more effective and easier to use trimmer setting, the pilot can precisely control the

course and speed, regardless of the weight they are carrying. The trimmer system has also been improved to allow for slower speeds on take offs and landings. The trimmers of the R-BUS 2 have a new design with a more ergonomic and progressive adjustment: the pilot can control the exact speed at all times.

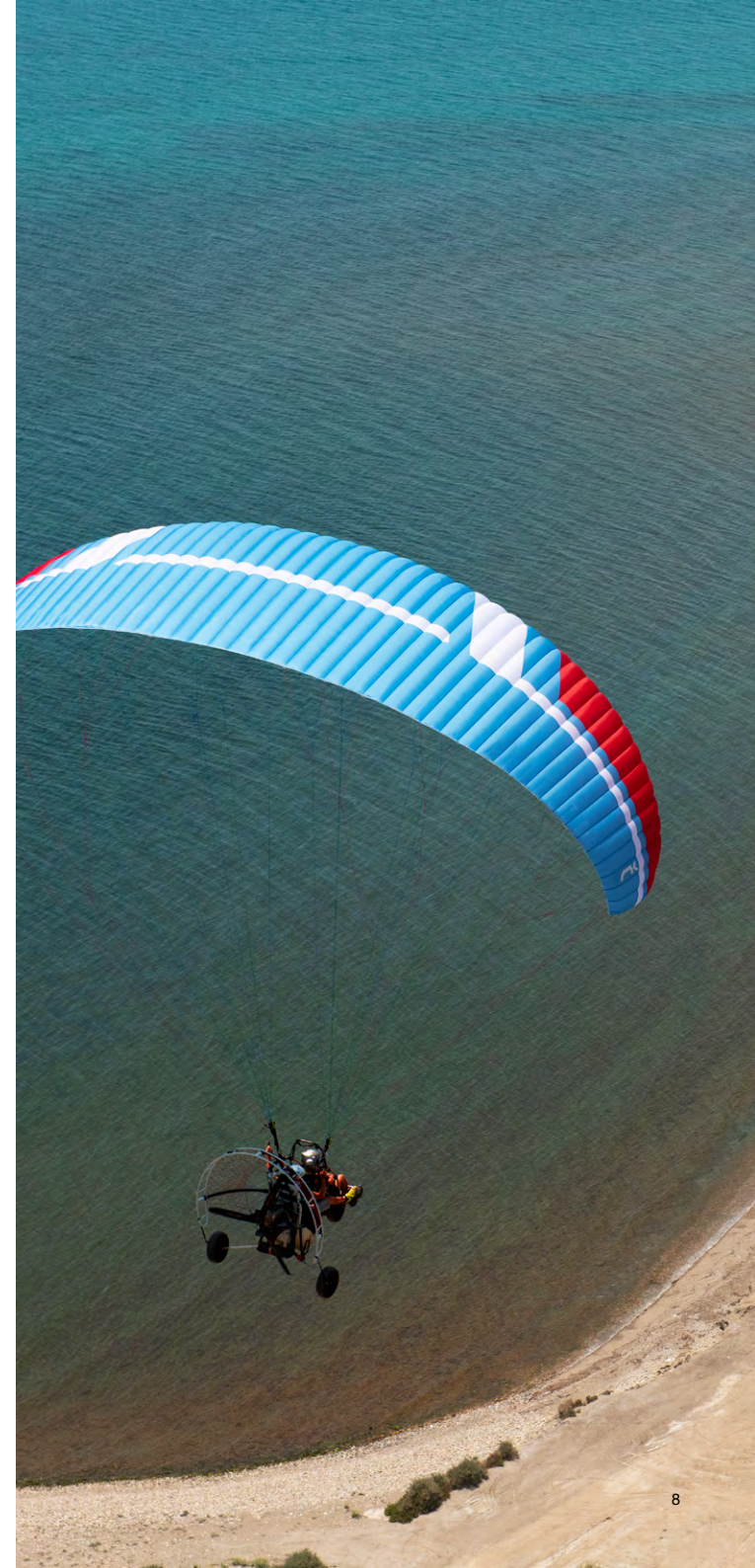
The use of Computational Fluid Dynamics (CFD) in the development of RSP allows us to have the right trimmer settings to maximise the useful part of the polar curve.



Neutral position - trimmers closed, all maillons are at the same height. This is minimum speed, better for gliding and less fuel consumption.



Accelerated position- as the trimmer is released, the travel of the C and D-risers increases progressively and therefore the angle of attack changes. This way the wing will attain more speed in exchange for more acceleration, consumption and increased sink.



3. THE FIRST FLIGHT

3.1 CHOOSING THE RIGHT LOCATION

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

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

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 TAKEOFF

For launch, a smooth and progressive inflation is recommended. The R-BUS 2 comes up easily, without requiring additional energy, and does not overfly the pilot. It is a straight forward exercise leaving enough time for the pilot to decide whether to accelerate and take off or not.

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

3.7 FOLDING INSTRUCTIONS

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

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

The Niviuk Koli Bag is designed for ultra-fast packing and can easily be carried as a backpack.

It allows you to unpack the wing quickly and easily. Just place the wing inside the Koli Bag and secure it with the compression straps.

Perfect for short walks or to transport the wing in the car without the risk of damage. It has two adjustable straps and a small inner pocket to avoid the risers getting tangled with the lines.



4. IN FLIGHT

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

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


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

Note that glider behaviour can vary, depending on size or wing-loading for the same size. Even within the same size, at maximum or minimum load, the behaviour and reactions of the wing may vary.

The performance and speed of the R-BUS 2 depend on the engine power and wing-loading.

With the RSP (Reflex System Profile) the engine does not need much power to achieve greater thrust, resulting in less consumption, more autonomy, less need for power, better 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 note:

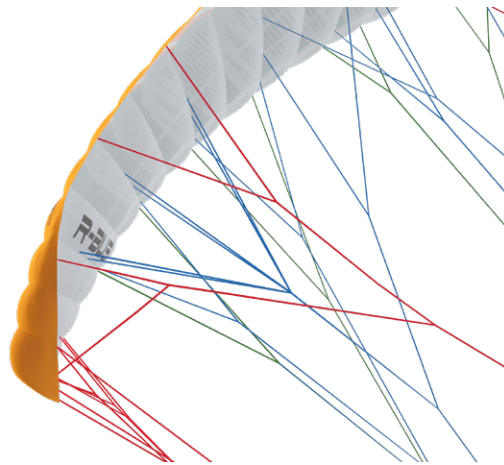
 The R-BUS 2 is a tandem wing with the capacity for great flights, but it must be handled correctly or it may cause serious problems for the pilot and passenger.

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

4.1 DOUBLE STEERING SYSTEM

The R-Bus 2 has two steering lines: the main brake (conventional brake) and the High Speed Tip (fixed to a separate handle on the riser). 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.

High Speed Tip: The High Speed Tip on the R-Bus 2 consists of a line with three attachment points located at the wingtip. It enables the pilot to correct the direction easily and accurately without using the main brake controls and therefore, the performance of the wing is not affected.



4.2 FLYING IN TURBULENCE

The R-BUS 2 has an excellent profile and is very robust and solid in these situations. It is very stable in all conditions and has excellent passive flight reactions, which makes it very safe 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 provokes a stall. If you have to take corrective action, make the input then re-establish the correct flying speed.

4.3 POSSIBLE CONFIGURATIONS

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

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

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

Asymmetric collapse

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

Frontal collapse

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

Negative spin

A negative spin does not conform to the R-BUS 2's normal flight behaviour. Certain circumstances however, may provoke a negative spin

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

Parachutal stall

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

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

Deep Stall

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

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

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

To resume normal flight conditions, progressively and symmetrically release the brake line tension to regain air speed. When the wing reaches the overhead position, the brakes must be fully released. The wing will then surge forward to regain full air speed. Do not brake excessively at this moment as the wing needs to accelerate to pull away from the stall configuration. If you have to control a possible frontal collapse, briefly pull both brake handles down to bring the wing back up and release them immediately while the glider is still in transition to reposition itself overhead.

Cravat

A cravat may happen after an asymmetric collapse, when the end of the wing is trapped between the lines. Depending on the nature of the tangle, this situation could rapidly cause the wing to spin. The corrective manoeuvres to use are the same as those applied in case of an asymmetric collapse: control the turn/spin by applying tension on the opposite brake and weight shift opposite to the turn. Then locate the stabilo line (attached to the wing tip) trapped between the other lines. This line has a different colour and is located on the outside position of the B-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 R-BUS 2 was designed to recover by itself in most cases. Do not try to over-correct it!

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

4.4 FLYING WITHOUT BRAKE LINES

If, for any reason at all, the R-BUS 2's brake lines become disabled in flight, it will become necessary to pilot the wing gently using 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 should be pulled symmetrically shortly before contact with the ground. This braking method is not as effective as using the brake lines, and hence the wing will land with a higher ground speed.

4.5 LINE KNOT(S) IN FLIGHT

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

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



5. LOSING ALTITUDE

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

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

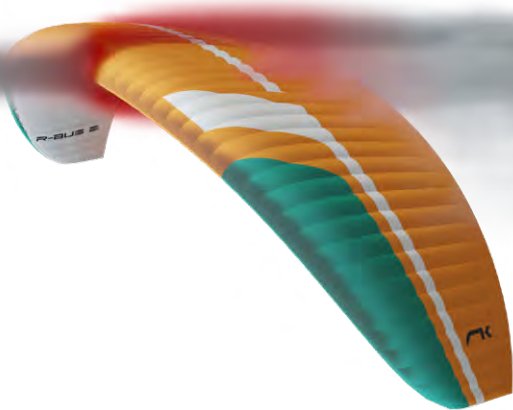
5.1 BIG EARS

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

To perform the Big Ears manoeuvre, take the outermost A-line on each A-riser (line 3A4) and simultaneously, smoothly pull them outward and downward. The wingtips will fold in to re-establish forward speed and the correct angle of attack, accelerate once the ears are pulled.

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

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



5.2 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.

5.3 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 ACROBATIC FLIGHT

Although the R-BUS 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 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

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

A pre-flight check is obligatory before each flight. If there is any damage to the equipment or you suspect any areas of the wing are susceptible to wear, you should inspect these and act accordingly.

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

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

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

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

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

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

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

7.2 STORAGE

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

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

Weight should not be laid on top of the equipment.

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

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

7.3 CHECKS AND INSPECTIONS

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

We strongly recommend that any repairs should be done in a specialist repair shop by qualified personnel. This will guarantee the airworthiness and continued certification of your R-BUS 2.

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

7.4 REPAIRS

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

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

Damaged lines must be repaired or exchanged immediately.

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

We recommend any inspection or repair is performed by a Niviuk professional in our [official workshop](#).

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 flying with a paramotor and/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.

9. WARRANTY

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

The warranty does not cover misuse of the equipment.

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

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



10. ANNEXES

10.1 TECHNICAL DATA

			31	34	37	40
Cells	Number		55	55	55	55
Aspect ratio	Flat		5,4	5,4	5,4	5,4
	Projected		4,13	4,13	4,13	4,13
Area	Flat	m ²	31	34	37	40
	Projected	m ²	27,12	29,74	32,37	34,99
Span	Flat	m	12,94	13,55	14,14	14,7
Chords	Maximum	m	2,97	3,11	3,24	3,37
Lines	Total	m	387	406	424	442
	Main		2+2/5/3/2	2+2/5/3/2	2+2/5/3/2	2+2/5/3/2
Risers	Number	3+1	A-A'/B/C/D	A-A'/B/C/D	A-A'/B/C/D	A-A'/B/C/D
	Trimmers	mm	140	140	140	140
Glider weight		kg	7,83	8,27	8,85	9,20
Total weight in flight	Min-max	kg	100-450	120-500	450-600	210-600
Identification/ Certification	8G max. 394kg 5,25G max. 450kg 5,25G max. 600kg		EN 926-1 DGAC LOAD TEST	EN 926-1 DGAC LOAD TEST	EN 926-1 DGAC LOAD TEST	EN 926-1 DGAC LOAD TEST

The total weight of the wing may differ ±2% due to variations in the weight of the fabric supplied by the manufacturers.

10.2 COLORS



Magma



Eclipse

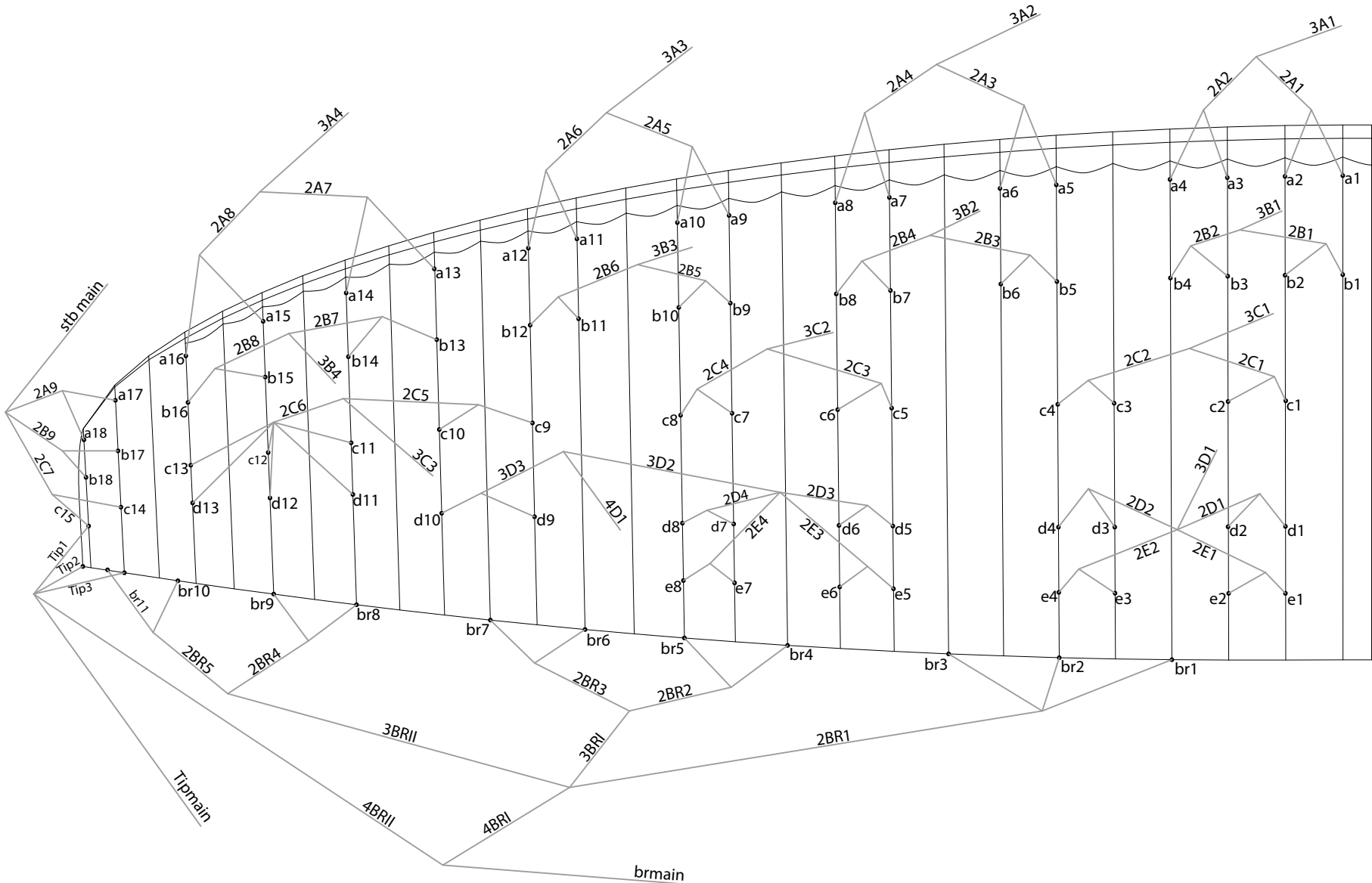
10.3 MATERIALS DESCRIPTION

CANOPY	FABRIC CODE	SUPPLIER
UPPER SURFACE	N30 DMF	DOMINICO TEX CO
BOTTOM SURFACE	N30 DMF	DOMINICO TEX CO
PROFILES	30 DFM	DOMINICO TEX CO
DIAGONALS	30 DFM	DOMINICO TEX CO
LOOPS	LKI - 12	KOLON IND. (KOREA)
REINFORCEMENT LOOPS	W-420	D-P (GERMANY)
TRAILING EDGE REINFORCEMENT	MYLAR	D-P (GERMANY)
RIBS REINFORCEMENT	LTN-0.8/1 STICK	SPORTWARE CO.CHINA
THREAD	SERAFIL 60	AMAN (GERMANY)

SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	TNL - 80	TEIJIM LIMITED (JAPAN)
UPPER CASCADES	TNL - 140	TEIJIM LIMITED (JAPAN)
MIDDLE CASCADES	TNL - 140	TEIJIM LIMITED (JAPAN)
MIDDLE CASCADES	TNL - 220	TEIJIM LIMITED (JAPAN)
MIDDLE CASCADES	TNL - 280	TEIJIM LIMITED (JAPAN)
MAIN	TNL - 220	TEIJIM LIMITED (JAPAN)
MAIN	TNL - 280	TEIJIM LIMITED (JAPAN)
MAIN	TNL - 400	TEIJIM LIMITED (JAPAN)
MAIN	TNL - 500	TEIJIM LIMITED (JAPAN)
MAIN BREAK	TARAX-240	EDELRID (GERMANY)
THREAD	SERAFIL 60	AMAN (GERMANY)

RISERS	FABRIC CODE	SUPPLIER
MATERIAL	G-R 23	TECNI SANGLES (FRANCE)
COLOR INDICATOR	PAD	TECNI SANGLES (FRANCE)
THREAD	V138	COATS (ENGLAND)
MAILLONS	MRI4	ANSUNG PRECISION (KOREA)

10.4 LINE PLAN



10.5 RISER ARRANGEMENT

A	A'	B	C	D
3A1	3A3	3B1	3C1	3D1
3A2	3A4	3B2	3C2	4D1
		3B3	3C3	
		3B4		
		stbmain		



10.6 LINE DIMENSIONS

R-BUS 2 - 31

LINES HEIGHT mm

	A	B	C	D	E	BR TIP	BR
1	7345	7226	7217	7305	7387	6994	8258
2	7285	7165	7149	7232	7318	6961	7937
3	7272	7154	7142	7228	7314	7096	7793
4	7311	7196	7204	7298	7378		7679
5	7320	7212	7218	7330	7414		7596
6	7264	7156	7176	7268	7353		7595
7	7270	7170	7208	7270	7347		7664
8	7316	7221	7277	7332	7401		7577
9	7321	7232	7324	7419			7520
10	7291	7204	7199	7509			7396
11	7292	7214	7146	7214			7371
12	7325	7253	7092	7163			
13	7271	7225	7158	7222			
14	7161	7130	6825				
15	7072	7051	6809				
16	7028	7024					
17	6799	6763					
18	6727	6728					

RISERS LENGHT mm

	A	A'	B	C	D	
	350	350	350	350	350	STANDARD
	350	350	350	420	490	ACCELERATED

R-BUS 2 - 34

LINES HEIGHT mm

	A	B	C	D	E	BR TIP	BR
1	7710	7586	7576	7668	7755	7348	8670
2	7647	7522	7506	7593	7683	7283	8335
3	7635	7511	7500	7590	7680	7323	8185
4	7676	7556	7565	7664	7748		8068
5	7688	7574	7582	7700	7789		7982
6	7629	7517	7539	7636	7725		7981
7	7637	7532	7574	7639	7719		8055
8	7686	7586	7647	7704	7777		7966
9	7692	7599	7697	7796			7907
10	7661	7570	7566	7891			7776
11	7663	7582	7512	7583			7751
12	7698	7623	7455	7529			
13	7642	7594	7525	7591			
14	7527	7494	7176				
15	7434	7412	7159				
16	7389	7384					
17	7148	7111					
18	7074	7074					

RISERS LENGHT mm

	A	A'	B	C	D	
	350	350	350	350	350	STANDARD
	350	350	350	420	490	ACCELERATED

R-BUS 2 - 37

LINES HEIGHT mm

	A	B	C	D	E	BR TIP	BR
1	8059	7929	7920	8017	8106	7670	9091
2	7994	7864	7847	7938	8033	7574	8742
3	7982	7853	7842	7937	8031	7720	8586
4	8025	7900	7912	8014	8102		8466
5	8039	7921	7931	8055	8147		8377
6	7979	7862	7886	7988	8081		8378
7	7988	7879	7924	7992	8075		8455
8	8040	7936	8000	8060	8136		8364
9	8047	7950	8054	8156			8303
10	8015	7920	7917	8257			8167
11	8018	7933	7862	7935			8141
12	8055	7976	7803	7880			
13	7997	7946	7876	7945			
14	7877	7843	7511				
15	7780	7757	7493				
16	7734	7729					
17	7483	7444					
18	7405	7405					

RISERS LENGHT mm

	A	A'	B	C	D	
	350	350	350	350	350	STANDARD
	350	350	350	420	490	ACCELERATED

R-BUS 2 - 40

LINES HEIGHT mm

	A	B	C	D	E	BR TIP	BR
1	8394	8259	8251	8351	8444	8010	9443
2	8327	8192	8175	8270	8368	7884	9081
3	8315	8181	8172	8270	8367	8036	8920
4	8361	8231	8244	8351	8442		8796
5	8377	8254	8266	8395	8491		8704
6	8315	8193	8220	8327	8423		8706
7	8326	8212	8260	8331	8418		8787
8	8380	8271	8339	8402	8481		8693
9	8388	8287	8396	8503			8630
10	8355	8256	8255	8608			8490
11	8359	8271	8197	8274			8463
12	8398	8316	8137	8217			
13	8338	8285	8213	8285			
14	8214	8178	7833				
15	8113	8089	7815				
16	8065	8060					
17	7804	7764					
18	7723	7723					

RISERS LENGHT mm

	A	A'	B	C	D	
	350	350	350	350	350	STANDARD
	350	350	350	420	490	ACCELERATED

10.7 IDENTIFICATION/CERTIFICATION



FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

a	b	c	d	e	f	Révis n°
B	2	0	1	S F	0 4 0 7 4	E

- a) Construction en série : B - autres cas : A
 b) Monoplace : 1 - Biplace : 2
 c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostal : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06
 d) Code de l'autorité aéronautique
 e) Numéro d'ordre
 f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

Appellation ou type d'ULM	R-BUS 2 - 31
Constructeur	NIVIUK GLIDERS / AIR GAMES S.L.
Adresse	Carrer del Ter, 6 nave D 17165 LA CELLERA DE TER - GIRONA - ESPAGNE

DESCRIPTION DE L'ULM

Activités particulières prévues	n/a			
Options prévues	n/a			
Masse minimale	Masse maximale	Voiture		
		Fabricant	Modèle/Référence	
100 kg	450 kg	Niviuk Gliders/Air Games SL	R-Bus 2 - 31	
Référence manuel d'utilisation	Référence manuel d'entretien	Surface à plat	Résistance minimale d'ancrage	
Manuel R-BUS 2	Manuel R-Bus 2	31 m²	2400 daN	
Limitations du constructeur de la voile vis-à-vis des GMP	Puissance maximale 73.5 kW			

Pour le Ministre chargé de l'Aviation Civile
 Document établi le : 21 Février 2023
 (annule et remplace toute version précédente)

A remplir par le constructeur d'ULM en série ou par son représentant pour toute copie conforme remise à l'acheteur.

Je soussigné..... certifie que l'ULM, numéro de série..... est conforme au dossier technique ayant fait l'objet de la présente fiche d'identification.

à le :
 signature et cachet de l'entreprise



FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

a	b	c	d	e	f	Révis n°
B	2	0	1	S F	0 4 0 7 5	E

- a) Construction en série : B - autres cas : A
 b) Monoplace : 1 - Biplace : 2
 c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostal : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06
 d) Code de l'autorité aéronautique
 e) Numéro d'ordre
 f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

Appellation ou type d'ULM	R-BUS 2 - 34
Constructeur	NIVIUK GLIDERS / AIR GAMES S.L.
Adresse	Carrer del Ter, 6 nave D 17165 LA CELLERA DE TER - GIRONA - ESPAGNE

DESCRIPTION DE L'ULM

Activités particulières prévues	n/a			
Options prévues	n/a			
Masse minimale	Masse maximale	Voiture		
		Fabricant	Modèle/Référence	
120 kg	450 kg	Niviuk Gliders/Air Games SL	R-Bus 2 - 34	
Référence manuel d'utilisation	Référence manuel d'entretien	Surface à plat	Résistance minimale d'ancrage	
Manuel R-BUS 2	Manuel R-Bus 2	34 m²	2400 daN	
Limitations du constructeur de la voile vis-à-vis des GMP	Puissance maximale 73.5 kW			

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 signature et cachet de l'entreprise

FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

a	b	c	d	e				f	Révis n°			
B	2	0	1	S	F	0	4	0	7	6	E	-

- a) Construction en série : B - autres cas : A
 b) Monoplace : 1 - Biplace : 2
 c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostal : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06
 d) Code de l'autorité aéronautique
 e) Numéro d'ordre
 f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

Appellation ou type d'ULM	R-BUS 2 - 37
Constructeur	NIVIUK GLIDERS / AIR GAMES S.L.
Adresse	Carrer del Ter, 6 nave D 17165 LA CELLERA DE TER - GIRONA - ESPAGNE

DESCRIPTION DE L'ULM

Activités particulières prévues	n/a			
Options prévues	n/a			
Masse minimale	Masse maximale	Voiture		
		Fabricant	Modèle/Référence	
150 kg	450 kg	Niviuk Gliders/Air Games SL	R-Bus 2 - 37	
Référence manuel d'utilisation	Référence manuel d'entretien	Surface à plat	Résistance minimale d'ancrage	
Manuel R-BUS 2	Manuel R-Bus 2	37 m²	2400 daN	
Limitations du constructeur de la voile vis-à-vis des GMP	Puissance maximale 73.5 kW			

Pour le Ministre chargé de l'Aviation Civile
Document établi le : 21 Février 2023
(annule et remplace toute version précédente)

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à le :
signature et cachet de l'entreprise

FICHE D'IDENTIFICATION ULM DE CLASSE 1

(à joindre à la carte d'identification)

a	b	c	d	e				f	Révis n°			
B	2	0	1	S	F	0	4	0	7	7	E	-

- a) Construction en série : B - autres cas : A
 b) Monoplace : 1 - Biplace : 2
 c) Paramoteur : 01 - Pendulaire : 02 - Multiaxe : 03 - Autogire : 04 - Aérostal : 05 - ULM à motorisation auxiliaire : 1A - 2A - 3A - Hélicoptère : 06
 d) Code de l'autorité aéronautique
 e) Numéro d'ordre
 f) Utilisation : Loisir : L - Activité particulière : T - Loisir et activité particulière : E

Appellation ou type d'ULM	R-BUS 2 - 40
Constructeur	NIVIUK GLIDERS / AIR GAMES S.L.
Adresse	Carrer del Ter, 6 nave D 17165 LA CELLERA DE TER - GIRONA - ESPAGNE

DESCRIPTION DE L'ULM

Activités particulières prévues	n/a			
Options prévues	n/a			
Masse minimale	Masse maximale	Voiture		
		Fabricant	Modèle/Référence	
210 kg	450 kg	Niviuk Gliders/Air Games SL	R-Bus 2 - 40	
Référence manuel d'utilisation	Référence manuel d'entretien	Surface à plat	Résistance minimale d'ancrage	
Manuel R-BUS 2	Manuel R-Bus 2	40 m²	2400 daN	
Limitations du constructeur de la voile vis-à-vis des GMP	Puissance maximale 73.5 kW			

Pour le Ministre chargé de l'Aviation Civile
Document établi le : 21 Février 2023
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signature et cachet de l'entreprise



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