USER MANUAL
IKUMA P

IKUMA P

The adventure comes with you

WELCOME

We want 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 emotions, which resulted in the creation of the new IKUMA P. Our company is proud of this new carefully designed glider, bringing maximum pleasure during a pilot's progression.

The power of the Ikuma is now available in a lightweight version. Designed for pilots who want to go off the beaten track, even before taking off. Reduced weight and volume mean you can take this new Easy Performance wing wherever you want to go.

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.

USER MANUAL

NIVIUK GLIDERS IKUMA P

This manual includes all the necessary information pertaining to the IKUMA P'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 IKUMA P manual.

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

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SUMMARY

1. CHARACTERISTICS

1.1 WHO IS IT DESIGNED FOR?

The IKUMA P is the lightweight version of the standard Ikuma, the EN B+ 'Easy Peformance' wing - but with up to 1.4 kg less weight (size 27). Designed for pilots passionate about cross-country and Back Country, hike & fly or vol-biv adventures, this new lightweight model has reduced weight and volume to make it easier to carry and transport.

If the Ikuma was a wing designed for discovering new areas, going off the beaten track and discovering new and alternative routes (what we at Niviuk call Back Country), with the new IKUMA P now you can also reach take-offs which are currently difficult or impossible to access.

1.2 CERTIFICATION

The IKUMA P's load test, conducted by the Air-Turquoise testing centre in Switzerland, exceeded 8 G of force.

1.3 IN-FLIGHT BEHAIVOR

Niviuk developed the IKUMA P by adopting very specific guidelines: the objective was to seek utmost performance while minimising gear weight and volume for easy transportation, simple and relaxed flying, and above all, maintain a very high level of wing safety .

With progressive, predictable and efficient handling the IKUMA P effectively reads the air mass, seeking out and coring thermals with efficiency and ease. The IKUMA P remains agile, light and predictable in all conditions of flight and behaves impeccably during turbulence.

The IKUMA P was designed with the latest innovations in materials and technologies, and that aspect provides the glider with a better performance in all phases of flight.

With an aspect ratio of 5.7, it is a 3-liner that provides clear and useful information to the pilot; it situates itself into the centre of the thermal or it follows the ascending air flow. Its air intakes have been replaced, so the application of the RAM Air Intake turns the leading edge into a powerful and key element to the wing's performance. While flying the IKUMA P the pilot feels that they can reach their full potential.

If you already are a Niviuk pilot, the improvements of the IKUMA P will surprise you. If this is the first time you pilot a Niviuk glider, just enjoy it!

1.4 ASSEMBLY, MATERIALS

The IKUMA P has all the technological innovations used on other Niviuk gliders. Furthermore, it is full of small details like the SLE, RAM, DRS, TNT, IKS and 3 line profile which are destined to enhance the pilot's comfort and to improve the performance of the wing.

SLE.- The use of the SLE (Structured Leading Edge) 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.

RAM.- The RAM Air Intake technology presents an internal positioning of the air intakes to provide optimal and constant internal pressure while improving laminar air flow on the undersurface. As a result, a significant turbulent air buffering takes place at the leading edge for better consistency across the speed range, and hence increasing performance with maximum safety.

DRS.-The trailing edge has been reinforced with small ribs that make this part flatter in order to spread the pressure out evenly. It means better air-flow and less drag on this important part of the glider. The addition of these ribs gives exceptional handling (better and more efficient when turning) and more control and precision.

TNT.- A revolutionary technique using Nitinol, developed to build the

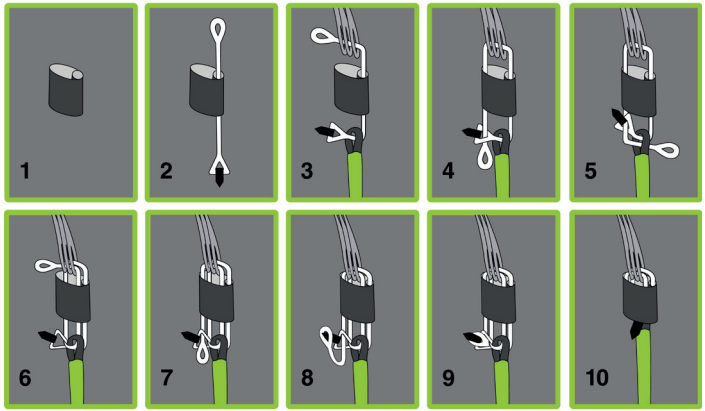
internal structure of the glider, brings a more uniform profile, and hence reduces the overall wing weight to gain efficiency in flight. The Nitinol provides the highest level of protection against deformation, heat or breaks. Using this technological advance, the glider is able to maintain its original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

3LT.- Its powerful profile, a detailed internal architectural structure, and the use of high-tech strength materials make it possible to obtain a significant reduction of the combined line lengths, hence reducing the amount of parasitic drag and the weight of the glider for better efficiency.

IKS.- The IKS (Interlock System) is an ultra-lightweight, high strength connecting system that aims to complement the light product range and replace the current systems based on the use of the maillons and/or carabiners. This new system is based on a secure connection using a simple Dyneema loop provided with a fixing and locking system, ensuring the complete efficiency and safety of the connection, and allowing the equipment to be ready at all times, either with or without load.

The IKS1000 is designed and dimensioned as a connection system between the risers and the lines. It has a breaking load of 1055 kg, which greatly exceeds that of the classic 3mm (550 kg) maillon, but with a much less weight. This feature makes it a key element in the entire range of P-Series (lightweight) wings, which are delivered with this technology as standard.

Please note: the IKS1000 kg system was not designed nor certified to connect the risers to the harness and/or a rescue parachute to the harness. For that specific function, Niviuk developed the IKS3000. For more information visit niviuk.com



1. Locate the elastic sleeve's inner small diameter tube.

2. Push the IKS line through it.

3. Push now the IKS line through the lines and the riser. The reinforced end with the black tab should be located on the side of the riser.

4. Push the upper looped end downward through the elastic sleeve (not the small diameter tube) and then through the reinforced loop end where the black tab is located.

5. Continue with the procedure in a counter-clockwise motion by pushing the looped end through the riser.
6. Push the looped end first upward through the elastic sleeve (not the small diameter tube) and through the lines again following the same pattern.

7. Push the looped end downward through the elastic sleeve (not the

small diameter tube) first, and then through the loop with the reinforced end (black tab) once more.

8. Push the reinforced end loop (black tab) through the looped end to secure them together.

9. Pull tight to secure the knot and connection.

10. Check the entire assembly

The IKUMA P's line set is made from Edelrid Aramid. The Aramid lines are not sheathed, thus directly exposed to potential abrasions. Consequently and in accordance with the EN certification recommended guidelines, lines must be inspected by a professional certified servicing centre every hundred (100) hours. These high performance materials require particular attention before each flight.

The fabric used to manufacture the glider is light, resistant and durable and will not experience colour loss.

From Olivier Nefs 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 lines are semi-automatically cut to length and all the sewing is completed under the supervision of our specialists. 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 efficient final inspection. 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 packaged 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 reviewed on the final pages of this manual.

1.5 ELEMENTS, COMPONENTS

The IKUMA P is delivered with a small fabric repair kit, including self-adhesive ripstop matching the wing's colour scheme, a compression strap to pack the wing into a small volume, a bag with straps, the speed-bar and the new Inner Bag.

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. Meeting these conditions will help with the necessary steps required to check and inflate the IKUMA P. We recommend that a qualified instructor is present to supervise the entire procedure.

We recommend that an instructor or a Niviuk dealer supervises 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 abnormalities. Identify, and if necessary disentangle the A, B', B and C lines, the brake lines and the corresponding risers. Make sure that there are no knots.

2.3 HARNESS ASSEMBLY

Correctly connect the risers to the harness' carabiners. The risers and 6 lines should not have any twists and be sorted in the right order. Check that the harness buckles are fully locked and secured in place.

2.4 HARNESS TYPE

The IKUMA P has been certified as an EN B with a harness according to the following norms:

- 2. DV LuftGerPV §1, Nr. 7 c (LTF)
- European Standard EN1651
- European Standard EN12491

This certification allows it to be flown with most of the harnesses on the market, even the ones that use a pod. We strongly recommend that you adjust the distance of the chest strap according the parameters used during certification. This varies according to the size of the chosen harness.

Small = 44 cm
Medium = 45 cm
Large = 46 cm

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 bring as much feedback, in addition to increasing the risk of experiencing a riser twist during a collapse.
We recommend referring to the harness' instruction manual and the certification test report outlining the chest strap length adjustments used during these tests.

2.5 SPEED-BAR

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

The IKUMA P includes a speed system with a maximum travel of 12 cm. The speed system is engaged when the pilot pushes the speed-bar - **not included as standard with this glider model** - with their feet. The pilot must install and adjust the speed-bar and connect it to the risers (See 2.5.1: "Speed system assembly").

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

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

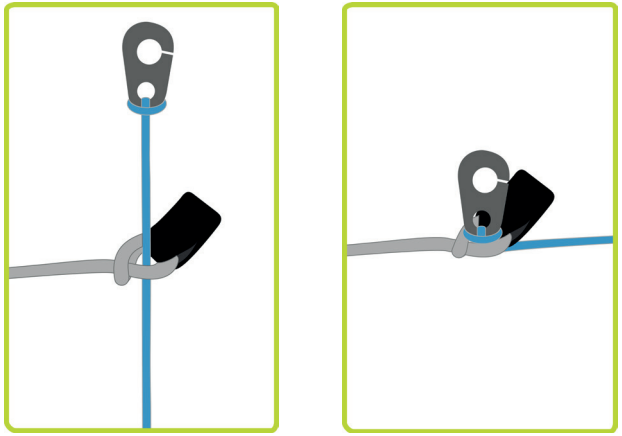
- **Released speed-bar:** the A, B', B, C risers are aligned.
- **Full speed-bar:** the difference between the A - C risers is 12 cm.

PLEASE NOTE!
The use of the speed system results in changes to the speed but also the reactions of the wing. For more information, see the certification report.

2.5.1 Speed system assembly.
The speed-bar consists of the bar that the pilot pushes with their feet, as well as the two cords that connect it to the speed system components on the risers. Once the pilot has chosen the type of speed-bar they prefer, they must install it. Some considerations:

- The pilot should use the type of speed-bar that they consider appropriate, depending on the type of harness, preferences, etc.
- This accessory is removable to facilitate its connection and / or disconnection to the risers as well as subsequent adjustment.
- It is important to follow the manufacturer's instructions during the speed-bar installation. The majority of harnesses have a speed system pre-installed.
- The standard connection of the speed-bar to the speed system is via Brummel hooks, where two slots in the hooks are interlocked, making their connection / disconnection easy. However, any safe connection system can be used.

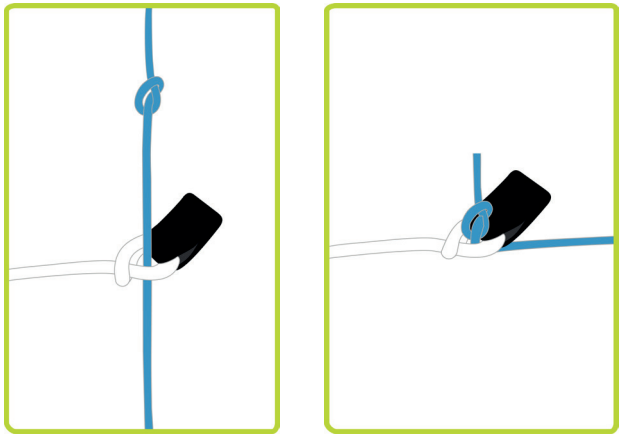
Graphic 1. Speed-bar connection using Brummel hooks



Plume (P) models - please note
The P models were designed with the idea of saving weight across the entire equipment. To achieve this, Niviuk decided to deliver the wings without the classic Brummel hooks and opting for a kite-style knotting system. This system offers the same efficiency and safety as the classic Brummel hooks, but with much less weight.

Graphic 2. Speed-bar connection using a kite-style knotting system (without Brummel hooks).

1. We make a knot in the speed-bar cord and we pass this through the cord connections on the risers.
2. Apply tension to both sides until the knots are located tightly in the riser connections.



The system or procedure for connecting the kite knot is exactly the same as the Brummel hooks and can be used in other systems or connection elements.

2.5.2 Changing the riser cords.

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

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

2.6 INSPECTION AND WING INFLATION ON THE GROUND

Once all the gear is checked and deemed safe to use, inflate the IKUMA P and ground handle it as much as possible to become familiar with the wing's behaviour. The IKUMA P 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 IKUMA P will sit over your head.

2.7 ADJUSTING THE BRAKE LINES AND TOGGLES

The lower brake line length is pre-adjusted at the factory and identical to the ones used during the glider certification procedure. However, that length can be modified to the pilot's personal preference. We nevertheless recommend keeping the default factory settings as is, and adapt yourself to the IKUMA P's behaviour instead.

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 length during acceleration.

3. THE FIRST FLIGHT

3.1 CHOOSE THE RIGHT PLACE

The first flights with the IKUMA P 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 IKUMA P 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 more, as it is more conducive to carrying out a better visual check of the wing. The IKUMA P is especially easy to control during reversed 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 IKUMA P 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 IKUMA P 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 up on top of each 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 sections while taking care of not to bend or twist the SLE. There is no need for compression during the procedure; doing so may damage the fabric, including the risers and lines.

4. IN FLIGHT

4.1 FLYING IN TURBULENCE

The IKUMA P has an excellent profile design made to withstand various weather conditions, hence enabling the pilot to take advantage of its stability for greater piloting efficiency. It behaves impeccably in passive flight mode, thus offering a high level of safety in turbulent conditions. Nonetheless, the pilot always has to fly according to the prevailing weather conditions, and the pilot is the ultimate safety factor.

We recommend that the pilot to anticipate every move, understands the air mass and flies actively to make appropriate corrections with the right

input amount. Over-steering is dangerous, all actions must be undertaken in a timely manner, amplitude and duration. The ultimate piloting goal is to keep the speed of the glider going. AIR SPEED = SAFETY. Do not hesitate to ask questions and get advice from qualify certified personnel if in doubt.

4.2 POSSIBLE CONFIGURATIONS

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

Asymmetric collapse
In spite of the IKUMA P's profile stability, strong turbulent air may cause the wing to collapse asymmetrically if the pilot was 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 toggle 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 IKUMA P 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 (the causes the risk of a stall for 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
In normal flying conditions and due to the IKUMA P design, asymmetrical 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 untimely 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 IKUMA P'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 toggle 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 set 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 IKUMA P 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 entering 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 minded and ease off the brake lines upon 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 location.

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 toggles 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 a mountainside or other paragliders; it may not be possible to continue on the intended flight path and a subsequent collision could happen as result.

Over-handling
Most flying problems are caused by wrong pilot input, which then degenerates into a cascade of unwanted and unpredicted series of incidents. The IKUMA P was designed to recover by itself in most cases. Do no 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–handle the wing. You have to allow the glider to re-establish normal flying speed after any type of incident.

4.3 USING THE ACCELERATOR

The IKUMA P profile was designed for stable flight throughout its entire speed range. It is useful to accelerate when flying in strong winds or in extreme sink. When accelerating the wing, the profile becomes more sensitive to turbulence and closer to a possible frontal collapse. If a loss in internal wing pressure is felt, tension on the accelerator 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'.

The IKUMA P risers have been designed without any adjustable, removable or variable device to prevent and incorrect use of the speed system.

4.4 FLYING WITHOUT BRAKE LINES

If, for any reason at all, the IKUMA P's brake lines become disabled in flight, piloting the wing with the 'C' risers and weight shifting will become necessary. The C-lines can be used to steer the glider easily because they are not under much tension, however you will need to be careful and not handle them too heavily to cause a stall or negative turn. The wing must be flown at full speed during the landing approach, and the C-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 launching 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 for there will be an increased risk of stalling the wing or enter a negative turn.

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 ALTITUDE

Knowledge of different descent techniques could become vital in certain situations. The most adequate 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 3A2 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, gently pump them open asymmetrically and sequentially using the brakes, without altering the angle of attack, especially when flying near obstacles or flying in turbulent air.

5.2 3B2 TECHNIQUE

On the new generation paragliders the application of big ears can create a high degree of trailing turbulence which in turn creates a significant loss of airspeed. When big ears are applied to high aspect ratio wings the ears tend to 'flap' which also adds to the amount of unwanted turbulence.

This new rapid descent technique was first discovered by our Niviuk team Pilots in 2009 while flying a competition prototype wing, which because of its line plan and high aspect ratio would not allow big ears to be applied. In fact, big ears on wings with a profile of 2 lines can often prove difficult.

For all these reasons, we advise the use of the 3B2 line descent technique. This technique, which ensures a rapid descent, is achieved

whilst forward wing speed is maintained and so the risk of a deep stall is eliminated.

HOW?

Locate the 3B2 on your risers and, as you would when applying big ears, simply pull down firmly and smoothly until you see both wingtips drop back slightly. The forward speed of the glider will then reduce slightly, quickly stabilise and then increase. You will then experience a fall rate of around 5-6m/s. Controlled turning of the wing can easily be maintained by weight shifting the harness, exactly the same as you would with big ears. We recommend the application of the speed-bar whilst using this technique. To exit the manoeuvre release the lines as you would with big ears, control the pitch and the wing will quickly adopt normal flight.

This new technique allows a comfortable and controllable rapid descent without the risk of experiencing a 'cravat' or 'deep stall'.

We advise you to first try this technique in smooth conditions with sufficient altitude above appropriate terrain.

5.3 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 carry out this manoeuvre you have to take the B and B'-risers below the maillons and symmetrically pull both of them down (approx. 20-30 cm) and then hold this position. The initial phase is quite physical (a lot of resistance) 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 and 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 do but remember that the wing will stop flying, will lose all forward horizontal speed, and its reactions will change quite a bit when compared to a normal flight configuration.

5.4 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 toggle located on the inner side of the turn. The intensity of the turn can be controlled by braking slightly on the outer brake toggle. 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 toggle (down side of the turn) must progressively be relaxed while momentarily applying tension to the outer brake toggle 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 movements at sufficient altitude and with moderation.

5.5 SLOW DESCENT TECHNIQUE

This technique allows descent without straining the wing or pilot. Glide normally while searching for descending (catabatic) 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 CONSIDERATIONS

6.1 TOWING

The IKUMA P is suitable for towing. Only a qualified tow operator should be in charge of operating a certified paragliding winch. On the tow, the wing should be inflated the same way used during a hill/mountain flight takeoff.

6.2 ACROBATIC FLIGHT

Although the IKUMA P was tested by expert acrobatic pilots in extreme situations, it WAS NOT designed for acrobatic flight manoeuvres. DO NOT USE THIS GLIDER for aerobatic manoeuvres. We define aerobatic flight as any form of piloting where the paraglider is placed in attitudes that are not used in normal flight. To safely learn how to master aerobatic manoeuvres, instruction must be undertaken at a certified school, under the guidance of a qualified instructor and in a safe environment.

A complete wing and line inspection should be performed every six months, including repairs if necessary, to guarantee the integrity of the equipment. Extreme manoeuvres means you and your wing can be exposed to centrifugal forces that can reach 4 to 5 G.

7. CARE AND MAINTENANCE

7.1 MAINTENANCE

Careful maintenance of your equipment will ensure continued top performance.

The fabric and the lines should not 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 reach up to 60°C and damage it. Weight should not be laid on top of the equipment.

If the glider is stored with organic material, such as leaves, grass or insects trapped inside the cells, the chemical reaction can cause irreparable damage.

7.3 CHECKS AND INSPECTIONS

The IKUMA P must be periodically serviced. An inspection must be scheduled every 100 flying hours or every twenty four months whichever

comes first (EN/LTF normative).

Regular maintenance is the only way to guarantee the IKUMA P's integrity and keep it functioning as it should, while still conforming to the certification criteria.

7.4 REPAIRS

If the wing is damaged, you can temporarily repair it by using the ripstop material found in the repair kit, so long as no stitches are involved in the tear, otherwise the damaged area must be repaired in a specialist repair shop by qualified personnel. Do not attempt a home repair.

8. SAFETY AND RESPONSIBILITY

It is well known that paragliding is considered a high-risk sport, where safety depends on the pilot.

Incorrect use of this equipment may cause severe injuries to the pilot, or even death. Manufacturers and dealers cannot be held responsible for your decisions or any act or accident 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 or qualified coach.

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 realistic when evaluating your knowledge in respect to weather assessment before deciding whether or not to fly. Niviuk's liability coverage is for its product line only. Niviuk cannot be held responsible for your actions. Fly at your own risk!

10. TECHNICAL DATA

10.1 TECHNICAL DATA

IKUMA P			**21**	**23**	**25**	**27**
CELLS	NUMBER		57	57	57	57
	CLOSED		12	12	12	12
	BOX		21	21	21	21
FLAT	AREA	m^2	21	23	24,5	26,5
	SPAN	m	10,94	11,45	11,82	12,29
	ASPECT RATIO		5,7	5,7	5,7	5,7
PROJECTED	AREA	m^2	17,83	19,53	20,75	22,44
	SPAN	m	8,72	9,13	9,42	9,8
	ASPECT RATIO		4,26	4,26	4,26	4,26
FLATTENING		%	15	15	15	15
CORD	MAXIMUM	m	2,33	2,44	2,52	2,62
	MINIMUM	m	0,54	0,56	0,58	0,61
	AVERAGE	m	1,92	2,01	2,07	2,16
LINES	TOTAL METERS	m	220	230	238	247
	HEIGHT	m	6,67	6,98	7,2	7,49
	NUMBER		165	165	165	165
	MAIN		2/1+1/3	2/1+1/3	2/1+1/3	2/1+1/3
RISERS	NUMBER	3	A/B'+B/C	A/B'+B/C	A/B'+B/C	A/B'+B/C
	TRIMS	m/m	NO	NO	NO	NO
	ACCELERATOR	m/m	123	123	123	123
TOTAL WEIGHT	MINIMUM	kg	55	65	80	95
IN FLIGHT	MAXIMUM	kg	75	85	100	115
GLIDER WEIGHT		kg	3,3	3,5	3,7	3,9
CERTIFICATION	EN/LTF		B+	B+	B+	B+

10.2 MATERIALS DESCRIPTION

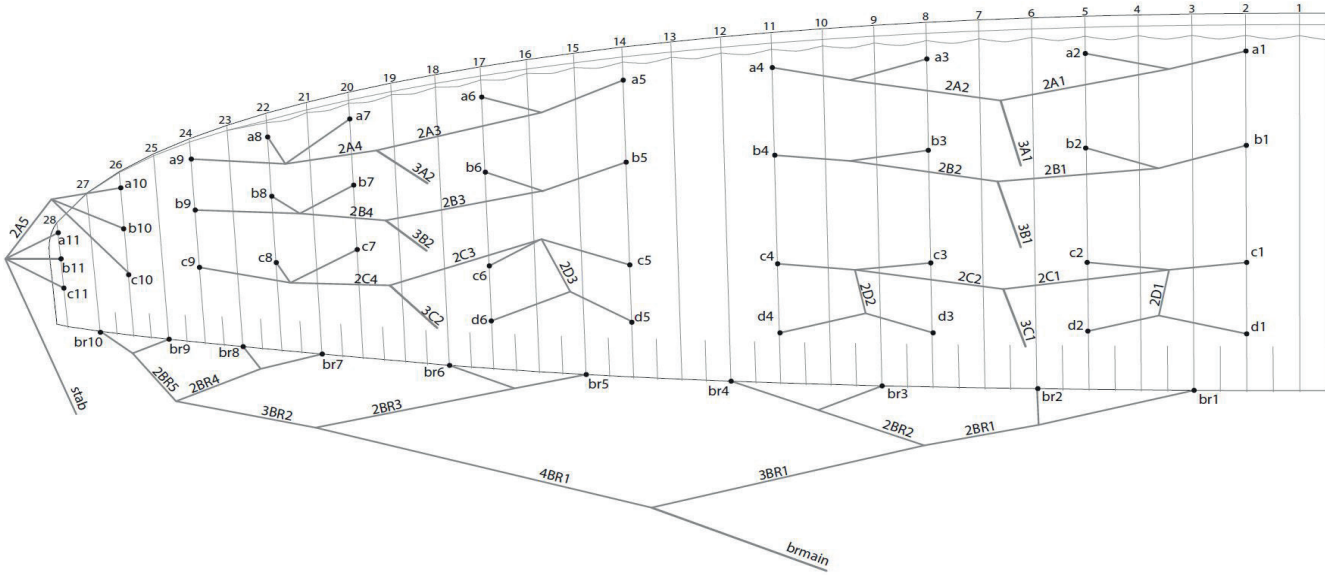
CANOPY	FABRIC CODE	SUPPLIER
UPPER SURFACE (LEADING EDGE)	9017 E25	PORCHER IND (FRANCE)
UPPER SURFACE (REMAINDER)	70000 E3H	PORCHER IND (FRANCE)
LOWER SURFACE	70000 E3H	PORCHER IND (FRANCE)
RIBS	70000 E91	PORCHER IND (FRANCE)
DIAGONALS	70000 E91	PORCHER IND (FRANCE)
LOOPS	LKI - 10	KOLON IND. (KOREA)
REINFORCEMENT LOOPS	SOFT DACRON	D-P (GERMANY)
TRAILING EDGE REINFORCEMENT	DACRON	D-P (GERMANY)
RIB REINFORCEMENT	LTN-0.8 STICK	SPORTWARE CO. (CHINA)
THREAD	SERAFIL 60	AMAN (GERMANY)

SUSPENSION LINES	FABRIC CODE	SUPPLIER
UPPER CASCADES	DC - 040	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 060	LIROS GMHB (GERMANY)
UPPER CASCADES	DC - 100	LIROS GMHB (GERMANY)
UPPER CASCADES	A-8000/U 50	EDELRID (GERMANY)
MIDDLE CASCADES	TNL - 080	TEIJIM LIMITED (JAPAN)
MIDDLE CASCADES	DC - 060	LIROS GMHB (GERMANY)
MIDDLE CASCADES	A-8000/U 50	EDELRID (GERMANY)
MIDDLE CASCADES	A-8000/U 130	EDELRID (GERMANY)
MIDDLE CASCADES	A-8000/U 190	EDELRID (GERMANY)
MAIN	A-8000/U 70	EDELRID (GERMANY)
MAIN	A-8000/U 230	EDELRID (GERMANY)
MAIN	A-8000/U 360	EDELRID (GERMANY)
MAIN BRAKE	TNL - 280	TEIJIM LIMITED (JAPAN)
THREAD	SERAFIL 60	AMAN (GERMANY)

RISERS	FABRIC CODE	SUPPLIER
MATERIAL	10148	LIROS GMHB (GERMANY)
COLOR INDICATOR	PAD	TECNI SANGLES (FRANCE)
THREAD	V138	COATS (ENGLAND)
PULLEYS	RF25109	RONSTAN (AUSTRALIA)

10.3 RISERS LAYOUT

10.4 LINE PLAN



10.5 LENGTHS IKUMA P 21

LINES HEIGHT m/m

	A	B	C	D	br
1	6213	6127	6233	6304	6972
2	6097	6012	6080	6161	6545
3	6048	5966	6044	6123	6326
4	6077	6001	6136	6203	6361
5	5991	5927	6011	6097	6241
6	5877	5824	5881	5971	6129
7	5797	5756	5808		6130
8	5755	5721	5796		6142
9	5760	5728	5841		6186
10	5535	5471	5496		6145
11	5364	5353	5381		

RISERS LENGTH m/m

	A	B'	B	C	
	480	480	480	480	STANDARD
	360	380	400	480	ACCELERATED

10.6 LENGTHS IKUMA P 23

LINES HEIGHT m/m

	A	B	C	D	br
1	6517	6427	6538	6614	7308
2	6397	6309	6379	6466	6862
3	6355	6270	6350	6435	6635
4	6388	6308	6448	6519	6672
5	6298	6231	6319	6409	6548
6	6180	6124	6183	6277	6431
7	6096	6054	6107		6433
8	6053	6017	6094		6445
9	6058	6024	6141		6492
10	5821	5754	5780		6450
11	5642	5630	5660		

RISERS LENGTH m/m

	A	B'	B	C	
	480	480	480	480	STANDARD
	360	380	400	480	ACCELERATED

10.7 LENGTHS IKUMA P 25

LINES HEIGHT m/m

	A	B	C	D	br
1	6750	6657	6771	6856	7558
2	6627	6536	6608	6704	7098
3	6577	6490	6571	6665	6865
4	6612	6529	6673	6753	6904
5	6520	6451	6541	6640	6776
6	6398	6341	6401	6503	6656
7	6312	6268	6323		6658
8	6267	6230	6310		6671
9	6273	6238	6358		6720
10	6013	5943	5970		6678
11	5827	5815	5846		

RISERS LENGTH m/m

	A	B'	B	C	
	480	480	480	480	STANDARD
	360	380	400	480	ACCELERATED

10.8 LENGTHS IKUMA P 27

LINES HEIGHT m/m

	A	B	C	D	br
1	7039	6943	7062	7146	7880
2	6913	6819	6893	6989	7403
3	6863	6772	6856	6950	7161
4	6900	6815	6962	7042	7202
5	6805	6733	6827	6924	7070
6	6679	6619	6681	6782	6946
7	6590	6544	6600		6948
8	6544	6505	6587		6962
9	6550	6513	6637		7013
10	6279	6206	6249		6971
11	6085	6073	6120		

RISERS LENGTH m/m

	A	B'	B	C	
	480	480	480	480	STANDARD
	360	380	400	480	ACCELERATED

10.9 HOMOLOGACIÓN

IKUMA P 21

para-test.com
paragliding by air turquoise

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NIVIUK

Class: **B**

In accordance with EN standards 926-2:2013 & 926-1:2006: **PG_1056.2016**

Date of issue (DMY): **13. 05. 2016**

Manufacturer: **Niviuk Gliders / Air Games S.L.**

Model: **Ikuma P 21**

Serial number: **Ikuma P 1-21 pattern V1**

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**75**	Range of speed system (cm)	**12.2**
Minimum weight in flight (kg)	**55**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**3.35**	Range of trimmers (cm)	**0**
Number of risers	**3**	Total speed range with accessories (km/h)	**25**
Projected area (m2)	**17.83**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Supair**	Warning! Before use refer to user's manual
Harness model	**Altiplume M**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**43**	
Distance between risers (cm)	**40**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A	A	A	A	A	A	A	A	A	B	A	A	A	B	A	A	A	A	A	A	A	A	0	□

IKUMA P 23

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NIVIUK

Class: **B**

In accordance with EN standards 926-2:2013 & 926-1:2006: **PG_1057.2016**

Date of issue (DMY): **13. 05. 2016**

Manufacturer: **Niviuk Gliders / Air Games S.L.**

Model: **Ikuma P 23**

Serial number: **Ikuma P 1-23 pattern V1**

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**85**	Range of speed system (cm)	**12.2**
Minimum weight in flight (kg)	**65**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**3.6**	Range of trimmers (cm)	**0**
Number of risers	**3**	Total speed range with accessories (km/h)	**25**
Projected area (m2)	**19.53**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Niviuk**	Warning! Before use refer to user's manual
Harness model	**Hamak M**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**44**	
Distance between risers (cm)	**44**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A	A	A	A	A	A	A	A	A	B	A	A	A	B	A	A	A	A	A	A	A	A	0	□

IKUMA P 25

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NIVIUK

Class: **B**

In accordance with EN standards 926-2:2013 & 926-1:2006: **PG_1019.2016**

Date of issue (DMY): **13. 05. 2016**

Manufacturer: **Niviuk Gliders / Air Games S.L.**

Model: **Ikuma P 25**

Serial number: **Ikuma P 1-25 pattern v2**

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**100**	Range of speed system (cm)	**12.5**
Minimum weight in flight (kg)	**80**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**3.8**	Range of trimmers (cm)	**0**
Number of risers	**3**	Total speed range with accessories (km/h)	**25**
Projected area (m2)	**20.75**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Supair**	Warning! Before use refer to user's manual
Harness model	**Access M**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**43**	
Distance between risers (cm)	**46**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
B	A	A	A	A	A	A	A	A	B	A	A	A	B	A	A	A	A	A	A	A	A	0	

IKUMA P 27

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NIVIUK

Class: **B**

In accordance with EN standards 926-2:2013 & 926-1:2006: **PG_1058.2016**

Date of issue (DMY): **13. 05. 2016**

Manufacturer: **Niviuk Gliders / Air Games S.L.**

Model: **Ikuma P 27**

Serial number: **Ikuma P 1-27 pattern V1**

Configuration during flight tests

Paraglider		**Accessories**	
Maximum weight in flight (kg)	**115**	Range of speed system (cm)	**12.5**
Minimum weight in flight (kg)	**95**	Speed range using brakes (km/h)	**14**
Glider's weight (kg)	**4.1**	Range of trimmers (cm)	**0**
Number of risers	**3**	Total speed range with accessories (km/h)	**25**
Projected area (m2)	**22.44**		

Harness used for testing (max weight)		**Inspections** (whichever happens first)
Harness type	**ABS**	every 24 months or every 100 flying hours
Harness brand	**Niviuk**	Warning! Before use refer to user's manual
Harness model	**Hamak L**	Person or company having presented the glider for testing: **None**
Harness to risers distance (cm)	**43**	
Distance between risers (cm)	**46**	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
B	A	A	A	A	A	A	A	A	B	A	A	B	B	A	A	A	A	A	A	A	A	0	

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