

# PASHA<sup>5</sup>



USER MANUAL

Version 1.0 Stand 16.04.2013

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## **Dear MAC PARA pilot**

We congratulate you on your purchase of a MAC PARA paraglider. Extensive development work and numerous tests make the Pasha 5 a high performance biplace paraglider with maximum possible safety. The Pasha 5 is constructed for thermal and cross-country flying, and will enable pilots to get maximum enjoyment. The Pasha 5 offers very easy inflation and simple ground-handling characteristics by take off, excellent handling in flight and easy landing. Please read this manual carefully before you start, this way you will get the most out of your glider, and enjoy many nice flights. MAC PARA wish you many pleasant flights with your Pasha 5.

## **Please read this manual carefully and note following details:**

Paragliding is a sport, which demands, besides the optimum equipment, a high degree of attentiveness, good judgement, and theoretical knowledge. Paragliding can be a dangerous sport, which may lead to injury and death. This paraglider meets at the time of delivery requirements of the EN (European Norm) 926 or LTF (German Certificate of Airworthiness). Any alternations to the paraglider will render its certification invalid! The use of this paraglider is solely at the user's own risk! Manufacturer and distributor do not accept any liability. Pilots are responsible for their own safety and their paraglider airworthiness. The paraglider carries no warranty! The author assumes that the pilot is in possession of a valid paragliding licence for glider's category, insurance etc.

Before delivery, as well as during production, each paraglider goes through a strict visual inspection, and is test-flown by your dealer. Stamps on the placard, together with a completed test-flight certificate, confirm this. Check that the paraglider has been test-flown before your first take-off. If it has not, consult your dealer.

Any inadequate use or misuse increases the risks considerably. The Pasha 5 must not be used outside the certified weight range. The Pasha 5 must not be used during rain or snow-fall. The Pasha 5 must not be used in high or gusty winds. The Pasha 5 must not be used in cloud and fog. The Pasha 5 must not be used by pilots without sufficient knowledge or experience.

If, after carefully reading this handbook, you still have questions, suggestions or criticism regarding this product do not hesitate to contact your dealer or us. We will be glad to help and advice.

**MAC PARA wish you many pleasant flights with your**

**Pasha 5**

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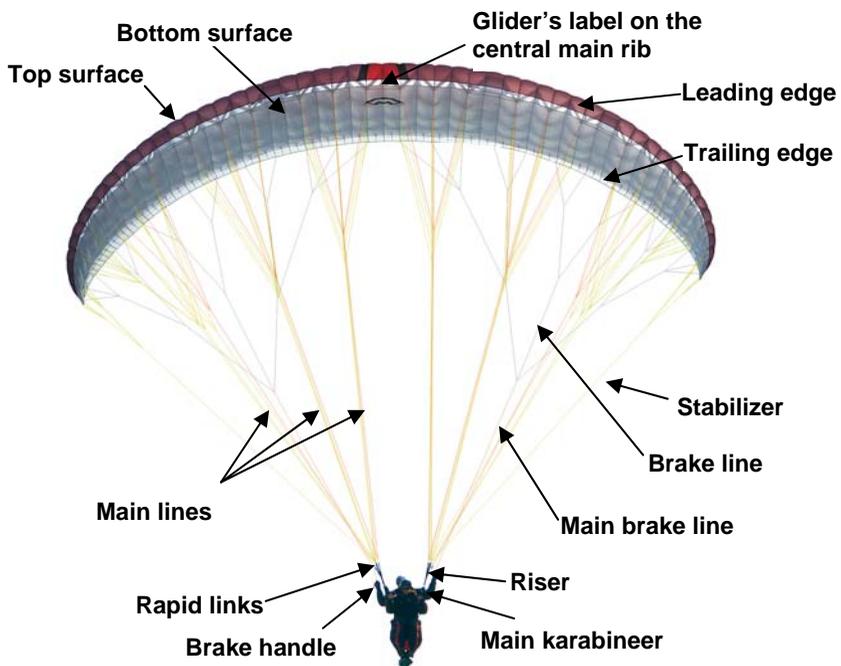


## Operating limits

The Pasha 5 has been tested by DHV certification laboratory to LTF B / EN-B category. The Pasha 5 is certified for tandem flight. The Pasha 5 has been load and shock-tested and passed with a load corresponding to 8G of the maximum weight in flight 220 kg. Its flying tests have shown that the glider remains stable and controllable over a wide range of normal and abnormal flight conditions. Nevertheless, turbulence and gusting winds can lead to a partial or complete collapse of the canopy. Therefore never fly in such conditions.

Any changes made to this paraglider invalidate the certificate of airworthiness.

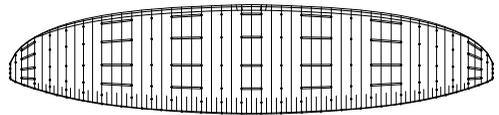
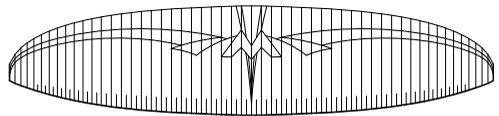
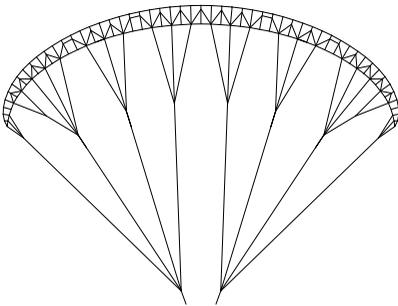
## OVERALL PLAN



## Construction of the canopy:

The canopy of the PASHA 5 consists of 54 cells over the wingspan. The wingtips are slightly pulled down and this produces a kind of stabilizer. The Pasha 5 is a second rib diagonal-construction paraglider. Every second main rib is attached to the 4 or 5 suspension lines. Between these main suspension ribs, intermediate ribs are suspended by diagonal segments. These segments do not lead to top surface of canopy but are attached at 80% of rib's height. This construction ensures a smooth top surface and precise airfoil reproduction. The internal reinforcements maintain the precise form of the canopy and provide stability. The cell openings on the under-surface of the profile's nose provide airflow into the glider. Stretch resistant flares, integrated with diagonal ribs at the suspension points, ensure an even distribution of load throughout the canopy. A stretch resistant Mylar strip on the top and bottom panels alongside the openings and running the length of the trailing edge defines the wingspan, together with an optimized sail tension; this guarantees high form stability. Large cross ports allow effective airflow inside the canopy, providing good re-inflation without reducing the profile accuracy.

The Pasha 5 is mainly made of the proven Nylon fabrics Porcher Marine Skytex Rip-stop 9017 E25A and 9017 E29A. Like any synthetic material, this can deteriorate through excessive exposure to UV.



## Rigging system:

The lines of the Pasha 5 are made of proven strong and stretch resistant Polyester HMA Aramid/Kevlar (yellow core) lines and PES/Dynema (white core) lines. The entire rigging system comprises individual suspension lines looped and stitched at each end. The Aramid lines have strengths from 60 up to 420 kg. The Aramid cascade lines have strengths from 80kg up to 160 kg.

The suspension lines are comprised of "cascaded top lines" (attached to the under-surface), "cascaded middle lines" (cascade 3 to top lines together on outermost main lines), and "main lines". Main lines lead to the "quick link" (a Maillon which connects lines and risers). The "stabilizer lines" connect the upper stabilizer lines on the outer suspension points with the quick link. The "brake lines" are not load carrying suspension lines. They lead from the trailing edge of the canopy to the main brake lines and run to the brake handles through the pulleys attached to the D-risers.



A mark on the main brake line indicates the position of the brake handle. This adjustment, on the one hand, allows sufficient brake to be applied during extreme flying situations and when landing, while on the other hand, this ensures that brakes are not permanently applied to the canopy (especially when fully accelerated). This trimming should not be altered. For differentiation purposes the A-lines are coloured red, the brake lines are orange, all remaining lines are yellow. Also the main suspension loop, on the bottom of the riser, is covered red. This is where the main karabiner should be hooked in, which then in turn connects the risers to the harness.

The Pasha 5 is equipped with 5 risers per side (A, A1, B, C, D). The two central A-lines per side are attached to the main A-risers while the outermost A main lines are attached to A1 risers. The 3 B-main lines and the stabilizer lines are attached to the B-riser. The 3 C-main lines to the C-riser. The 3 D-main lines to the D-riser. The main brake lines leads through the pulleys on the D riser.

The line connections are made to triangular Maillons (quick links) fitted with a rubber "o- ring" in the form of a "figure eight" which prevents any slipping of the lines on the quick link. See line plans for details.

### **Risers with trim system:**

Each of the riser sets of the Pasha 5 has a lockable trimmer.

The trim system shortens and lengthens the B, C and D risers and changes the angle of attack. In normal flight, all risers are in a "neutral position" and are of equal length (46 cm to the bottom edge of the rapid links). This position is marked with a white line on the trimmer straps. When you pull down the straps that run through the trimmers, the B-risers are shortened up to 1 cm, C-straps up to 2.5 cm, and the D-risers up are shortened to

5 cm. When you open the trims (push the trim buckles) , the B-risers are extended up to 1 cm, C-straps up to 2.5 cm, and the D risers are extended by up to 5 cm.

### **Operation and handling:**

Connect the risers to the spreader-bars before take off. It is important to ensure that the hook points on each spreader bar are equal. By pulling the straps that run through the trimmers, the B / C / D straps are shortened. This increases the angle of attack and the glider flies slower. By opening the trimmers, the B / C / D risers are extended.

This decreases the angle of attack and therefore the glider flies faster.

### **Trim**

The glider is delivered with a five riser system and tandem spreader-bars. Its speed varies in the range from 36 - 47 km/h depending on the wing loading and position of the trimmers. The brake lines should always be adjusted so that the first brake-lines just come under tension when the brake handles have been pulled 5 - 10 cm. The test results relate to this brake-line adjustment. In extreme situations other settings may lead to the glider reacting differently. To be able at all times to react quickly enough to possible problems; you should not let go of the brake handles during the flight (it may be possible to hold both handles in one hand). Alter the line length to bring the handles to a suitable height when using your harness.



## Safety equipment

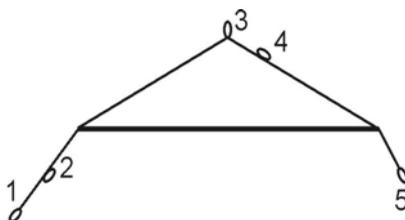
An optimal outfit should be a matter of course for every paraglider pilot. Always wear stout footwear, a helmet, and gloves. Clothing should be warm and allow sufficient freedom of movement. A rescue-system can be life-saving in case of an irremediable disturbance of the canopy, collapse in the air or material failure, and is therefore imperative.

## Tandem spreader bar

The PASHA 5 tandem spreader-bar allows varied attachment possibilities, allowing for the difference in heights and weights of pilot and passenger. Changing the main attachment (karabiner - min. strength 24 kN) position can allow for weight difference: the front position (3) for heavier passengers or if their weights are the same and the back position (4) for lighter passengers. The passenger weight is always compared to the weight of the pilot!

The rescue system bridle must be connected to main suspension point on the spreader-bar (3 or 4). It is possible to use a separator karabiner (min. strength 24 kN) for the rescue system, clipped in to the same loop as the main karabiner. The rescue system bridle must not be connected only to the pilot's or passenger's harness or to the spreader-bar's hang points.

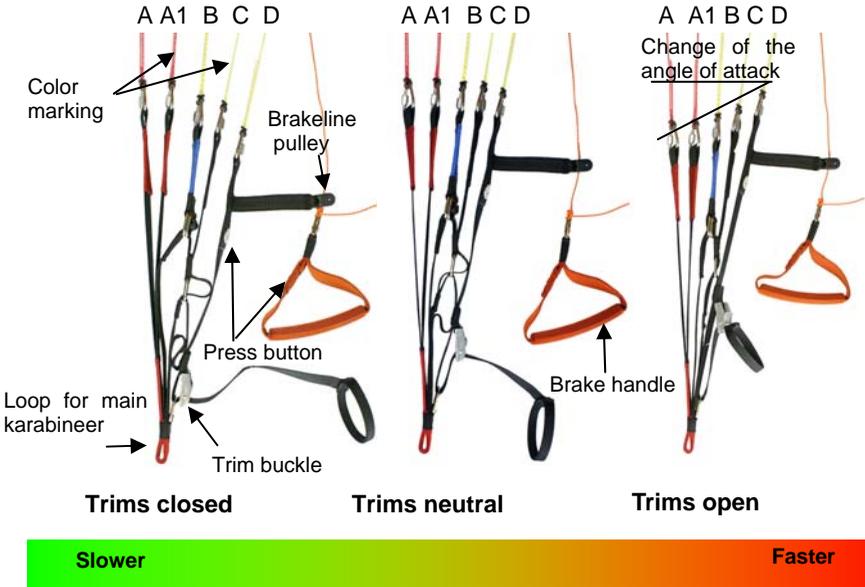
**WARNING: The karabiners used in position 3 or 4 must be karabiners designed for tandem flight, which means the minimum strength must be 24 kN. (Recommendation Austrialpin Powerfly, Austrialpin Delta). This applies also to the karabiner used for the attachment of the rescue system in Position 3 or 4.**



1. Passenger's hang point.
2. Passenger's hang point.
3. Main suspension and rescue system attachment point, when passenger is heavier than the pilot or when passenger is the same weight as the pilot.
4. Main suspension and rescue system attachment point, Main suspension and rescue system attachment point, when passenger is lighter than the pilot.
5. Suspension point for the pilot.



## Riser



## Riser lengths Pasha 5

	A	A1	B	C	D
<b>Trims open</b>	<b>460</b>	<b>460</b>	<b>465</b>	<b>485</b>	<b>510</b>
<b>Trims closed</b>	<b>460</b>	<b>460</b>	<b>440</b>	<b>435</b>	<b>410</b>

The lengths are measured from the main attachment point to the lower edge of rapid links.

## Tissue

(PORCHER SPORT, Rue du Ruisseau B.P. 710,38290 ST. QUENTIN FALLAVIER, FRANCE)

Top Sail - Leading Edge - SKYTEX 38 E25A - 100% nylon 6.6 , 33 Dtex, 38 g/m<sup>2</sup>

Top Sail - Trailing Edge - SKYTEX 38 E25A - 100% nylon 6.6 , 33 Dtex, 38 g/m<sup>2</sup>

Bottom Sail - SKYTEX 38 E25A - 100% nylon 6.6 , 33 Dtex, 38 g/m<sup>2</sup>

Main ribs, Diagonals - SKYTEX 40 E29A - 100% nylon 6.6 , 33 Dtex, 40 g/m<sup>2</sup>

Ribs - SKYTEX 38 E25A - 100% nylon 6.6 , 33 Dtex, 38 g/m<sup>2</sup>

Reinforcement Main Ribs - Grille Polyester 200 g/m<sup>2</sup>

Reinforcement Ribs - W382 Polyester 180 g/m<sup>2</sup>

## Lines

(EDELMAN+RIDDER+CO. Achener Weg 66, D-88316 ISNY IM ALLGEAU, GERMANY)

Stabilizer cascade - Aramid/Polyester A-6843-060, Breaking Load 60 kg

Upper cascade A,B,C,D - Aramid/Polyester A-6843-080, Breaking Load 80 kg

Upper cascade A,B - Aramid/Polyester A-7343-140, Breaking Load 140 kg

Middle cascade D - Aramid/Polyester A-6843-080, Breaking Load 80 kg

Main lines A1,B1,C1,D2,D3 - Aramid/Polyester A-7343-280, Breaking Load 280 g

Main lines 2,A3,B2,B3 - Aramid/Polyester A-7343-420, Breaking Load 420 kg

Main lines D1,D2,D3 - Aramid/Polyester A-7343-190, Breaking Load 190 kg

Stabilizer line - Aramid/Polyester A-7343-140, Breaking Load 140 kg

Brake lines upper cascade - Dynema/Polyester A-7850-100, Breaking Load 100 kg

Brake lines middle cascade - Dynema/Polyester A-7850-130, Breaking Load 130 kg

Main Brake Line - Dynema/Polyester A-7850-360, Breaking Load 360 kg

(Cousin Trestec, Comines CEDEX, France)

Upper cascade D - Vectran – 0,9mm Bruchlast 90 kg

Upper cascade E - Vectran – 0,6mm Bruchlast 45 kg

## Attachment straps

(STAP a.s., 407 80 VILEMOV, CZECH REPUBLIC)

STAP-POLYESTERBRIDLE 13 mm, Breaking Load 70 kg

## Risers

(MOUKA TISNOV ltd, Koráb 133, 66601 Tišnov, Czech Republic)

Polyester 367 040 025 912 25x1,5 mm Breaking Load 800 kg

## Thread

(AMANN SPONIT ltd, Dobronická 635, 148 25 PRAHA 4, CZECH REPUBLIC)

Lines-SYNTON 60, Main lines-SERABOND 60, Canopy-SYNTON 40, Riser-SYNTON 30

## Rapid links

(ELAIR SERVIS, CZECH REPUBLIC)

NIRO TRIANGLE 200 - Max. Load 200 kg

## TECHNICAL SPECIFICATIONS

Biplace Size		Pasha 5 39 (M)	Pasha 5 42 (L)
Zoom flat	[%]	95,7	100
Area flat	[m <sup>2</sup> ]	39,17	42,50
Area projected	[m <sup>2</sup> ]	35,07	38,05
Span flat	[m]	14,54	15,15
Span projected	[m]	12,21	12,72
Aspect ratio flat	-	5,4	5,4
Root cord	[m]	3,36	3,50
Cells	-	54	54
Weight	[kg]	8,65	8.7
Weight range *	[kg]	110-190	130-220
Min.speed	[km/h]	23-25	23-25
Speed Trimmers closed	[km/h]	36-38	36-38
Speed Trimmers open	[km/h]	45-47	45-47
Glide ratio	-	9,7	9,3
Min. Sink rate	[m/s]	1,05	1,10
Cetification with trimmers	-	EN - B	EN - B
Weight range paramotoring	[kg]	173-253	196-296

\* pilot & passenger = weights naked + cca. 25 kg

## HARNESS

The Pasha 5 is certified with LTF GH type certified harnesses. Nearly all harnesses available on the market are type "GH".

These "GH" harnesses are different to "GX" harnesses, which have a lower attachment point for the main karabiners and effective cross bracing. The Pasha 5 was not tested with harnesses with an effective cross bracing system.

Any certified harness with a hang point at about chest height may be used with the Pasha 5 (37-50cm over seat plate). The distance between left and right main karabiners should be between 45 and 60cm, depending on the size of the pilot and the type of the harness. Please note: the hang point position changes the position of the brakes relative to the pilot's body.

## CHECKS ON A NEW PARAGLIDER

Before delivery, as well as during production, each paraglider goes through a strict visual inspection. Additionally we recommend that you to check your new glider in accordance with the following points. We recommend that you make this check after flying extreme manoeuvres or after tree landings or similar.

- Inspection of the canopy for tears or damage, especially the seams which join the ribs to the upper and lower surfaces, but also the area of the attachment tapes and brake-line connections.
- Inspection of the lines for damage to the stitches. The line lengths must be checked after 50 hours flying time and whenever the flight behaviour of the glider changes
- Inspection of attachment tapes for damage to the stitches. It is also important to check the attachment tapes and brake-lines for tangles.
- Inspection of the risers for faultless condition. Rapid links must be secured.

With even slight damage the glider loses its airworthiness!

## ADJUSTING BRAKE LINES

The brake lines lead from the trailing edge of the canopy to the main brake lines which then run through pulleys on the D-risers to the brake handles. A mark on the main brake line indicates the position of the brake handle.

The glider is delivered with a standard set-up and its speed can reach 36 - 47 km/h depending on the weight of the pilot and the passenger and position of trims. The brake-lines should always be adjusted so that the first brake-lines just come under tension when the brake handles have been pulled 5 - 10 cm. The test results relate to this brake-line adjustment. This adjustment, on the one hand, allows sufficient brake to be applied during extreme flying situations and when landing, while on the other hand, it ensures that the canopy is not permanently braked (especially when fully accelerated). This trim should not be altered. In extreme situations any other settings may lead to the glider reacting differently to versions which have been tested.

**NOTE!!** If in doubt about the brake-line adjustment, it is preferable to leave them too long, as any necessary shortening can easily be achieved by wrapping them round your hand.

## FLYING THE PASHA 5

The following information must not under any circumstances be taken as a manual for practising paragliding. We would like to advise you of the Pasha 5's features and important information for your flying and security.

### Preparing for take off:

As with any aircraft, a thorough pre-flight check must be made prior to each flight on the Pasha 5!

Before every launch check lines, risers and canopy for damage! Do not launch with even the slightest damage!

Also check the maillons connecting the lines and the risers. They have to be closed tight.

Put on the harnesses and spreader-bars with maximum care and check the handle of the safety system and that all the flaps of the outer container are fastened securely and correctly. The main karabiners must also be checked carefully. Replace it if any damage is visible, or generally after 300 flying hours. Connect harnesses with the spreader-bars and finally connect the risers to your spreader-bars with the main karabiners. Check carefully that they are properly closed.

**Attention! Never fly with an open main karabiner! Do not take off if you find any damage to your equipment!**

Having unpacked and laid out the paraglider in a slight horseshoe pattern the following checks must be made:

### Checklist:

Preparing the wing:

- canopy without any damage
- risers and spreader-bars without any damage
- maillons (quick links) closed tight
- stitching of the main lines near the risers is o.k.
- all main lines run free from the riser to the canopy, brake lines are free

Putting on the harness:

- rescue handle and deployment pins secure
- buckles (leg and chest strap) closed
- main karabiners

Before takeoff:

- spreader-bars mounted and connected properly
- risers not twisted
- brake handle in hands, brake lines free
- pilot's position relative to the wing (centred: all lines same tension)
- wind direction
- obstacles on the ground
- free airspace



When laying out the glider, the wind direction should be observed. The canopy should be deployed into the wind so both halves of it are loaded symmetrically. The paraglider should be arranged in a semicircle into wind. This ensures that the A-lines in the centre section of the canopy will tension before the ones at the wing tips. Thus the canopy inflates evenly and an easy launch in the desired direction is guaranteed.

All lines and risers should be carefully untangled and arranged in such a way that they do not catch on anything.

It is equally important to untangle the brake lines so that they are clear and can not catch on any thing during launch. The brake lines should run freely through the pulleys to the trailing edge of the canopy.

Make sure the risers are not twisted; this can prevent the brake lines from running freely through their pulleys.

It can often be impossible to untangle lines during flight.

It is important that no lines are looped around the canopy. Also called a “line-over”, this may have disastrous consequences during take off. Finally connect the risers to the spreader-bar using the main karabiners. Check carefully that they are closed properly.

## Launch

The Pasha 5 is very easy to launch. This is possible in almost all wind conditions except strong headwinds.

The trimmers should be adjusted to neutral position or 3 cm released in according to the wind and terrain.

**Generally we recommend the use of both A-risers (A and A1) for take off. Depending on the launch technique, and wind conditions the pilot can alternatively use only middle A-risers to inflate the canopy.** Before take off recheck the canopy, the direction of the wind and the air space around you! When the pilot is ready to take off he/she holds all A-risers and the brake handles in each hand. To facilitate differentiation between the risers, the A-lines, including the sleeves on the A-risers, are coloured red. Before take-off, place yourself centrally at the gliders axis. Let the B-, C- and D-risers fall into the crook of your arm and hold the A risers with arms outstretched behind you.

**For the Pasha 5 we recommend take off from slightly tensioned lines.** The Pasha 5 is easy to launch. **If the pilot allows too much slack in the lines to the canopy the glider can get too much energy during inflation and the canopy can overfly the pilot, and this may lead to a collapse.** A good progressive run ensures your Pasha 5 will inflate and come up equally and quickly. Should the canopy surge forward, control it by braking. Now do a visual check upwards, to ensure the canopy is completely open (otherwise, abort the take-off). Only then is the final decision to continue the launch taken! If anything is not completely safe the launch should be aborted! Now accelerate continuously until you lift off. It is easier to take-off in a light headwind if after reaching minimum flying speed you apply the brakes slightly. After the take-off, gently release the brakes again.



The most important thing is the constancy of the pull on the A risers and not the power. Since the Pasha 5 is very easy to launch, on steep take-offs or in stronger winds do not forget to brake properly to control the movement of the canopy. As already mentioned, this can be corrected by the right position of the trims.

**WARNING!!** Do not use the forward launch in very strong winds. Make sure you don't pull the risers too much towards yourself or downwards as this can result in a frontal collapse, or in an asymmetric take-off

The Pasha 5 is easy to reverse launch. When doing a reverse launch or when launching in strong winds the paraglider can possibly surge forward more quickly or lift off sooner than desired. To avoid this, walk uphill following the canopy during inflation. As this launch technique can be difficult and turning the wrong way can result in the pilot taking off with twisted risers. It is recommended to practice the reverse launch on a training hill or slight slope first. When deflating the canopy in strong winds, or aborting a launch, use the C- or D- risers, not the brakes. Using the brakes in strong wind will cause more lift, lifting the pilot up and dragging him/her much further back.

If you let go of the brake handles during take-off, take care that the brake line is not twisted around the brake pulley!

## Flight

The glider is delivered with a standard set-up and its speed can reach 36 - 47 km/h depending on the weight of the pilot and trims position. Always fly with sufficient clearance from the terrain. The Pasha 5 glides best with open brakes, descends best with lightly applied brakes. In turbulence fly with closed trimmers and brakes lightly applied (15-20 cm) to avoid canopy collapse. If the canopy pendulums forward, this should be corrected by prompt braking. A pendulum movement of the canopy backwards is corrected by loosening the brakes in good time.

In a calm air the Pasha 5 can reach its minimum speed (depending on the wing loading) by application of 70cm up to 75cm of the brake range.

## Faster Flying:

The angle of attack is changed by the trimmers. The speed difference between "closed" and "open" position of the trimmers is up to 5-6 km/h. The glider is less stable at higher speed and collapses easily. Never let go of the brake handles during fast-flying!

## Steering - turns:

The Pasha 5 is a very responsive paraglider and reacts very directly and instantly to any steering input. Weight shift input quickens turns and ensures minimal height loss. Any weight shift has a greater effect the more loosely the chest-strap is fastened. A combined technique of weight shift and pulling on the inside brake line is the most efficient turning method, whereby the radius of the turn is determined by the amount of inside brake pulled and weight shift. A stalling wing tip announces itself by a gentle surge backwards of the wingtip. If this occurs you will need to release the brakes immediately.



In case it is impossible to control the Pasha 5 with the brake lines the D-risers may be used to steer and land the canopy. Attention! Pulling brake too fast or too hard can result in the canopy entering a negative spin.

### Active Flying (Thermaling and Soaring):

In turbulent conditions the glider should be flown actively with brakes lightly applied to avoid canopy collapse. This improves stability by increasing the angle of attack of the canopy. The canopy should not rock back or surge forward much but should remain above the pilot. In turbulent flight, if the canopy pendulums forward, this should be corrected by prompt braking. A pendulum movement of the canopy backwards is corrected by releasing the brakes in good time. This is part of basic active flying.

### Approach and Landing:

To avoid excessively demanding situations on the approach to landing, it is important to initiate the process at an adequate altitude. This leaves you enough time to observe and appropriately deal with wind direction and any other aircraft in your vicinity.

The Pasha 5 is easy to land. The final leg of the landing approach must be into the wind. During this final glide the paraglider should be decelerated slowly and at approximately one meter above the ground, according to conditions, the pilot should flare the canopy. The glider may climb again, gaining height, if too much brake is used too early. Strong wind landings require correspondingly less brake. Do not apply full brake before the pilot is safely on the ground. The final glide during the landing approach should be straight and not marked by steep or alternating turns as these can result in a dangerous pendulum effect near the ground.

Attention! Do not allow the canopy to fall onto the leading edge with energy. This can destroy the material and affects the life of the ribs at the leading edge!

## TOWING

The Pasha 5 is certified for towing. The Pasha 5 has no out of the ordinary towing characteristics, although a relatively low angle of attack and thus low tow tension should be maintained during launch and the initial part of the tow. The Pasha 5 has no tendencies towards deep stall/parachuting. Therefore we allow tow-launched flights with a similar technique to that described above. **Trimmers released over Neutral position!** There is sufficient margin to counter-steer the glider in a normal towing situation. Make sure you use proper equipment, experienced personnel and all relevant safety precautions for towing. We recommend the use of a winching adapter: this should be mounted on the upper end of the main karabiner.

WARNING!! Please always ensure that the brake lines are adjusted to the lengths recommended here. Setting them shorter could lead to a tendency to stall during towed flight. Apart from this, there are no special procedures.

## MOTORISED FLIGHT

Note!! Although, motorized flight can be a great success due to the gliders very easy take-off characteristics, stability and good handling, always use a certified combination of engine - harness and glider. If in doubt check with your federation. Contact the manufacturer or importer for the current legality of motorized flight.

WARNING!! The Pasha 5 is not suitable for jumps from aircraft.

WARNING!! The Pasha 5 is not designed to be used for aerobatics.

## EXTREME FLYING MANOEUVRES

This section describes flying conditions which can be deliberately induced, or which can develop unintentionally due to turbulence or pilot error. Any pilot who flies through turbulence is sure to be faced with these special flight conditions at some point. So take a good look at these flight manoeuvres or prepare for them by SIV (safety training over water). Mastering these flying conditions significantly improves your active flight safety. Sufficient height, as well as carrying a reserve parachute, is imperative.

WARNING!! All the critical flight conditions described here require a thorough knowledge; otherwise carrying them out may be very dangerous. Sufficient height above the ground is imperative. Bear in mind that all deformations of the canopy can increase the sink rate by 2 - 10 m/sec, depending on the degree of deformation. Carrying out these manoeuvres wrongly may lead to a crash.

Remember this is a glider with unspectacular reactions to disturbances in the air. Whenever in doubt, raise the brakes and let the glider fly. The glider has a high internal pressure, resistance to tucking and very high degree of passive safety. It is recommended that at this stage you already practise an active flying style. The key to active piloting is keeping the glider above your head at all times. We recommend in principle that you hold the brake handle in your hand whenever possible, or fly with your hands through the brake handles, to allow you to react immediately to any possible disturbances.

WARNING!! If you fly with your hands through the brake handles, you may lose valuable time in activating the rescue system.

### Asymmetric collapse:

A negative angle of attack can cause all or part of the leading-edge of the Pasha 5 to collapse (e.g. in turbulent air). Basically the Pasha 5 will re-open spontaneously from closures of up to 70% with a change of direction of up to 180°. The time this takes, and the associated height loss, can however be noticeably reduced by appropriate action by the pilot. Apply opposite brake on the inflated side, the outside of the curve, to stop the turning movement of the canopy. This should be accompanied by appropriate weight-shift. If you react immediately, 30% brake on the open side should suffice to hold the canopy on a straight course. In the event of a big collapse, this braking should be applied very carefully to avoid stalling the remaining inflated wing. The pilot's correction for



direction can be aided by a pumping out the deflation; a slow, long pumping action of the brake of the deflated side of the wing helps the canopy to re-inflate.

If the pilot does not correct, the Pasha 5 usually self-recovers. However, if it does not self recover and the pilot does not correct the canopy can enter a stable spiral dive.

### **“Cravat” / Line-over:**

In the event of some lines becoming tangled during flight (whatever the cause), the following action is recommended:

The pilot stabilizes the glider by gently applying the brakes. Please be aware that in this condition the brake pressure can be higher and the brake travel shorter.

Without pilot input a line-over will result in a stable spiral dive.

Here are the various options to untangle a line-over:

- pumping the collapsed side.
- pulling the stabilizer line or lines causing the problem.
- should both measures fail, it may be possible to untangle the line-over by inducing a full stall. This manoeuvre, however, should only be carried out by advanced pilots with experience in extreme flight situations and with sufficient altitude available.

Attention! If these manoeuvres fail or if in any doubt, the pilot should instantly use their emergency parachute system!

### **Front Tuck:**

A front tuck can be induced by strongly pulling the A-risers or by sudden, heavy turbulence. The entire leading edge spontaneously collapses. Gentle braking on both sides will reduce the lateral pendulum motions and simultaneously accelerate re-inflation. The Pasha 5 generally self recovers from an initiated front tuck.

When having a very large front tuck, a frontal rosette can happen (the wingtips move forwards: shaping a horseshoe). Gentle braking can avoid this deformation.

A quick recognition of the situation and a quick reaction by braking on both sides as long as the collapsed wing is behind the pilot helps the recovery and limits the altitude loss.



## Parachutal stall (deep stall):

In a parachutal stall the paraglider has no forward momentum combined with a high descent rate. A parachutal stall can be caused by, among other reasons, a too slow exit from a B-line stall or severe turbulence. Porous canopies (UV influence) or canopies out of trim (stretched or shrunken lines) are much more susceptible to a parachutal stall and therefore should not be flown. These are some of the reasons regular checks should be carried out on your glider.

A wet canopy or temperatures below zero centigrade (0°C) may also cause a stable parachutal stall. The Pasha 5 will usually spontaneously recover from a parachutal stall within 2-3 seconds. If the canopy remains in a parachutal stall, it is sufficient to gently push both A risers forward or to push the accelerator.

Attention! If brakes are applied while in a parachutal stall, the glider may suddenly enter a full stall!

If a parachutal stall occurs on landing approach, the pilot should prepare for a hard landing and make a parachute roll landing. In close proximity to the ground, due to the forward surging pendulum effect, a recovery may be more dangerous than a hard landing in parachutal stall.

## Full-stall:

To induce a full stall, apply full brake on both sides. The glider slows down steadily until it stalls completely. The canopy suddenly surges backwards a long way. In spite of this uncomfortable reaction of the canopy, both brake lines must be consequently held down with all your strength until the canopy is stabilized (directly overhead). This usually takes 3-6 seconds. The Pasha 5 generally flies backwards during a full stall but doesn't always form a front rosette. A frontal rosette can be formed by entering the full stall slowly. When entering (braking) fast, the canopy will not always form the desired front rosette. Attention! Always apply both brakes evenly!

To recover from a full stall, Smoothly release both brakes simultaneously until 90% of leading edge reopens, then release brakes rapidly. The glider ends the full stall on its own without surging forward.

WARNING!! If the brakes are released rapidly and asymmetrically, the glider may surge almost 90° and suffer an extensive asymmetric collapse.

The danger of overcorrecting and overreacting exists during all extreme flight manoeuvres. Thus, any corrective action must be gentle and steady and done with feel!



## Spin (or negative spin):

Pulling brake on one side too fast or too hard can result in a negative spin. During a spin the canopy turns relatively fast around the centre section of the canopy while the inner wing flies backwards (hence the term negative).

### There are two usual reasons for an unintentional spin:

- One brake line is being pulled down too far and too fast (e.g. when inducing a spiral dive)
- When flying at low speed one side is being braked too hard (e.g. when thermaling).

To recover from an unintentional spin, the pulled down brake line should be immediately released as soon as a spin is suspected. The canopy will accelerate and return to its normal straight and stable flying position, without losing too much height. If the spin is allowed to develop for some time, the glider surges a long way forward on one side and a dynamic asymmetric collapse or a line-over can occur. Gently apply the brakes to avoid side or central collapse of the canopy and the possibility of a cravat (one of the tips becoming entangled in the lines).

**WARNING!!** If you are LOW and are in an unintentional spin, or if the canopy is caught in a cravat USE YOUR RESERVE.

## Wingover:

To induce a wingover the pilot flies consecutive alternating turns to gradually steepen the angle of bank. During wingovers with a high bank angle, the outside wing begins to unload. Further increase of the angle of bank must be avoided, because any possible resulting collapse may be quite dynamic!

**WARNING! Full-stall, spin and wingover (over 90 degree angle of bank) are prohibited aerobatic manoeuvres and may not be performed during normal flying. Incorrect recovery procedures or overreacting of the pilot may have dangerous consequences! Attention! The Pasha 5 is not designed to be used for aerobatics.**

## Alternative (emergency) steering:

If for some reason it becomes impossible to control the Pasha 5 with the brake lines the D-risers may be used to steer and land the canopy. Attention! Of course the range is much shorter (10-15 cm) than with the brakes. It is also possible to control the direction of the flight by pulling on a stabilizer line or by weight-shifting.

## RAPID DESCENTS

### Spiral dive:

A spiral dive is the fastest way to lose altitude, however, the very high G-forces make it difficult to sustain a spiral dive for long and it can place high loads on the pilot and glider. By tensing ones abdominal muscles and a higher body tension you can to some extent resist the high G-forces. Don't forget proper breathing! As soon as any, even slight, light dizziness or impaired vision is noticed the spiral should be exited immediately.

The Pasha 5 has a very effective spiral dive. This allows rapid descent without stalling. To enter a spiral dive the pilot should weight-shift on one side while slowly pulling the brake gradually on the same side as weight-shifting. During a spiral dive the angle of bank can be controlled by increasing or reducing the amount of inside brake. When spiral diving the Pasha 5 it is recommended that the outside brake is lightly applied. This helps stabilize the wing and enables an easier and safer exit from the spiral. To exit, release the inside brake slowly. The Pasha 5 did not show a tendency to remain in a stable spiral during testing. At high sink speeds or if the pilot keeps his weight on the inside, the wing can stay in a continued deep spiral and has to be actively exited. This is done by weight shifting to the outside and gentler braking of the outside wing.

**WARNING!!** Nearly all gliders will have a tendency to stay in the spiral if the sink-rate exceeds around 15-m/s, depending on weight-shifting, wing loading and G-force. In fact most gliders need a counter-input to end a turn.

**Attention!** Due to energy retention, the glider will climb a lot after a deep spiral-dive release. If you apply inner brake and decelerate the glider for two or three turns, big pendulum effects can be avoided.

**WARNING!!** Practise spiralling with caution and lower sink-rates to get a feel for the gliders behaviour. A pilot who is dehydrated or not accustomed to spiralling can lose consciousness in a steep spiral dive!

### Big ears:

When in big-ears, the horizontal speed is higher than the sink rate, unlike a spiral dive or a B-line stall. This rapid descent technique is used to quickly and horizontally exit a dangerous area in the desired direction. In order to collapse the outside wing, pull the outside A-lines.

When the pilot holds the outside A1-risers on both sides and pulls them down, the Pasha 5 easily tucks the outside wings and enters a stable descent mode. The pilot keeps hold of the brake handles along with the outside A1-risers in his hands. By braking on one side and weight-shifting, the canopy remains steerable.

Big-ears substantially reduces the risk of canopy stability problems in turbulent air. To exit Big-ears release the A1-risers. The canopy does slowly self-recover. If not, or to quicken the recovery, the pilot can gently apply brakes to the glider.

**WARNING!** Never do big-ears in spirals, as this may drastically reduce the number of lines taking the already high loads, causing structural failure.



Attention! All rapid descent techniques should first be practised in calm air and with sufficient height so the pilot can use them in emergency situations! By far the best technique is to fly correctly and safely, so you never have to descend rapidly!

### **B-line stalls:**

**WARNING:** Although it is possible to induce a B-stall with the Pasha 5, we recommend avoiding this manoeuvre, as very high loads occur on the ribs. Thus shortening the life of the canopy!

To induce a B-line stall symmetrically pull down slowly on both B-risers, until the canopy folds (parallel to its long axis). The airflow over the top surface is almost fully detached and the canopy enters a vertical descent flight mode without forward movement. Further pulling of the B-risers reduces the surface area more and increases the sink rate. (Up to 8 m/s) Be careful, pulling too far or too rapidly may cause a frontal horseshoe to form. To exit from this flight mode release the B-risers at first rapidly but then gently (1 sec). The canopy surges forward re-attaching the airflow over the top surface and resumes normal flight. When the B-risers are released, the brakes should not be activated. This will give the canopy the chance to gain speed and resume normal flight. On exit from a B-line stall on no account just release the B-risers, as this can cause overloading. If canopy does not recover apply both brakes gently to recover or pull the A-risers, until the canopy regains forward speed.

### **Summary:**

For all extreme manoeuvres and rapid descents please note:

- first practise manoeuvres with an instructor during safety training!
- before inducing any manoeuvre the pilot must check that there are no other airspace users below him!
- during the manoeuvre the pilot must have the canopy within his view!

## **LOOKING AFTER YOUR PARAGLIDER**

Looking after your canopy correctly will prolong the life of your paraglider.

### **Deterioration: a few tips!**

- The canopy is mainly made of NYLON, cloth which, like any synthetic material, deteriorates through excessive exposure to UV. Hence, it is recommended that you reduce UV exposure to a minimum by keeping the paraglider packed away when not in use. Even when packed in the bag do not leave it in the sun.
- Keep the canopy and lines clean as dirt may penetrate into the fibre and damage the lines or the cloth.



- Ensure that the lines are not folded tightly. It's extremely important to avoid any sharp bending of the lines, especially the main lines. Pay careful attention to the lines to avoid damaging them. Any over stretching of lines apart from the strain imposed during normal flight, should be avoided as over stretching is irreversible.
- Be careful, not to allow snow, sand or stones to enter inside the canopy's cells: the weight can change the angle of attack, or even stall the glider; additionally the sharp edges can destroy the cloth!
- Check line lengths after tree or water landings. They can stretch or shrink lines.
- Never drag the wing over rough ground! This will damage the cloth on the wear points. When preparing the wing on a takeoff with rough ground, don't pull the wing over it (i.e. by pulling the brakes). Please try to pack the wing on soft ground.
- Uncontrolled strong wind takeoffs or landings can result in the leading edge of the canopy hitting the ground at high speed which may cause rips in the profile and damage the rib material.
- Clean the paraglider with fresh water after contact with salt water. Salt water crystal can reduce line strength, even after rinsing in fresh water. Replace lines immediately after contact with salt water. Also check canopy material after water landings, as waves can place uneven forces and cause cloth to distort in specific areas. Always remove gliders from the water by holding only the trailing edge.
- Prevent lines from catching on anything as they may be over stretched. Do not step onto the lines. Although the lines were tested with a bending test they can be damaged if stepped on whilst on a hard surface, or if they come into contact with sharp objects.
- Do not always fold the canopy symmetrically to the centre cell as this can cause constant stress on the centre cell (centre cell always to the outside).
- Clean the paraglider with water and a soft sponge. Do not use any chemicals or spirits for cleaning, as these can permanently damage the cloth.

## Storage:

- Store the paraglider in a dry space at ambient temperature away from chemicals and UV light.
- Never pack or store the glider wet. This shortens the life of the cloth Always dry glider thoroughly before any packing or storage.
- During transport it has to be considered, that some materials of the paraglider are temperature sensitive. Avoid subjecting your wing to high temperatures (e.g. the luggage space of a parked car in the sun)!
- When sending your wing as a parcel, take extra care with packing.



## Repairs and checks:

- Tears in the canopy must be professionally sewn. Adhesive patches are only adequate for very minor damage.

Repairs should only be carried out by the manufacturer, distributor or authorized workshops. Only original spare parts may be used!

- The lines must be checked after every 50 hours flying time and whenever the flight behaviour changes
- Any changes to the canopy lines or risers, except those approved by the manufacturer, will void the certificate of airworthiness.
- The Pasha 5 must be checked as a minimum, after two years or after 100 flying hours by the manufacturer or authorized workshops.

## Disposal:

- The synthetic materials used in a paraglider need professional disposal. Please send disused canopies back to us: we will dismantle and dispose of it.

## In Conclusion:

The Pasha 5 is a modern paraglider. You will enjoy many safe years of flying with your Pasha 5 if you look after it correctly and adopt a mature and responsible approach to the demands and dangers flying can pose.

It must be clearly understood that all air sports are potentially dangerous and that your safety is ultimately dependent upon you. We strongly urge you to fly safely. This includes your choice of flying conditions as well as safety margins during flying manoeuvres. We recommend once more that you only fly with a certified harness, reserve parachute, and helmet. Also the certification placard must be present on the glider. Every pilot should be suitably qualified, have a valid license and 3rd party insurance.

The Pasha 5 is delivered with a stuff-sack, Velcro compression strap, MAC PARA backpack, repair kit and user manual.

# TREATING NATURE WITH RESPECT

Finally the call to practise our sport with respect for nature and wildlife! Don't walk outside marked routes, don't leave any waste, don't make needless noise and respect the sensitive biological balance in the mountain eco system: especially in the takeoff area!

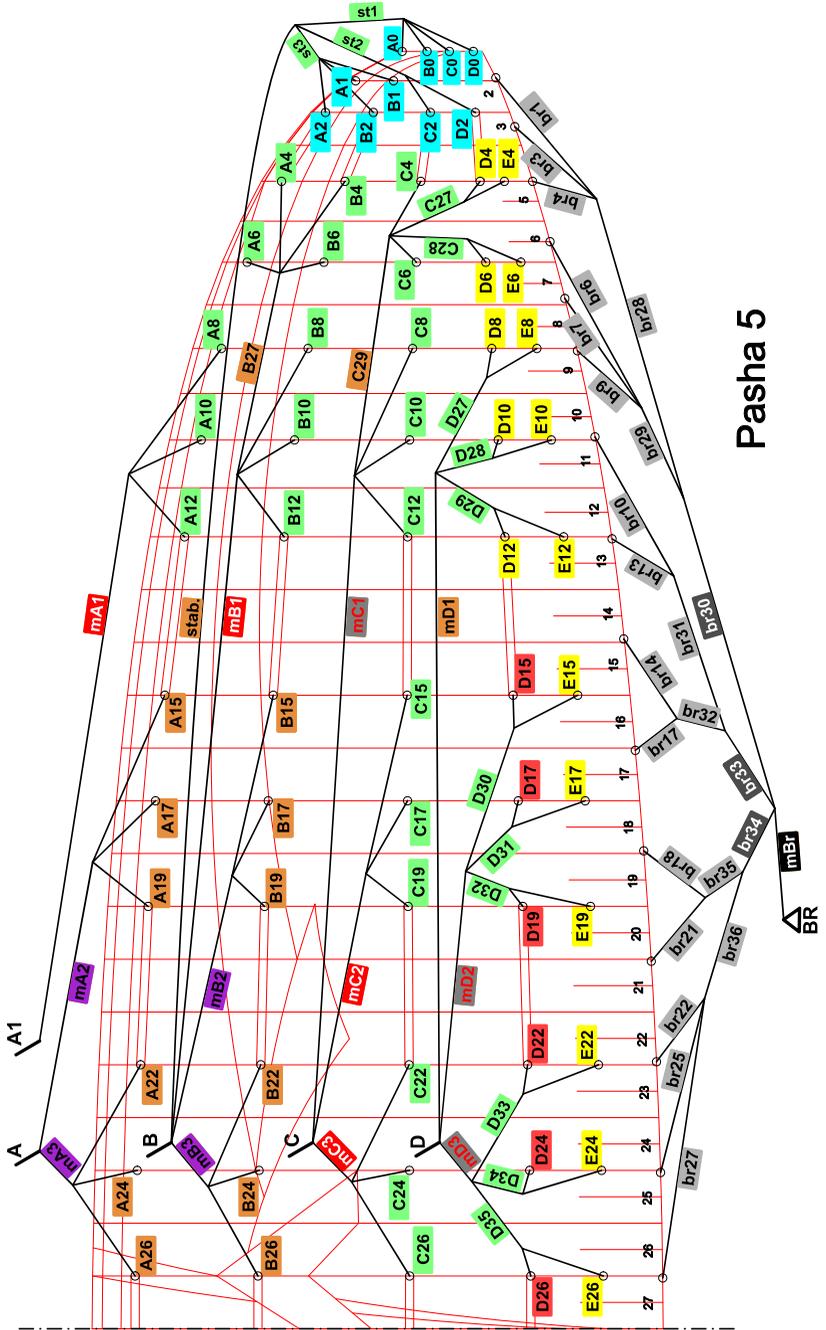
## LINE PLANS

### Line descriptions:

The following printed line plans show the line configurations and line lengths.

### Line Materials and Strengths:

Aramid/Polyester A-6843-060
Aramid/Polyester A-6843-080
Aramid/Polyester A-7343-140
Aramid/Polyester A-7343-190
Aramid/Polyester A-7343-280
Aramid/Polyester A-7343-420
Vectran 0,9
Vectran 0,6
Aramid/Polyester A-7850-100
Aramid/Polyester A-7350-130
Dynema/Polyester A-7850-360



Pasha 5



# FULL LINE LENGTHS

## Full line lengths Pasha 5-39

All lengths are measured from the loop of the main line up to the attachment point on the canopy. Brake lines are measured from the main brake line up to the trailing edge.

Center	A	B	C	D	E	Brakes
1	8687	8553	8634	8813	8982	9815
2	8597	8463	8545	8724	8880	9411
3	8608	8479	8557	8735	8890	9222
4	8602	8482	8551	8720	8870	8961
5	8536	8425	8482	8647	8791	8886
6	8562	8453	8500	8667	8808	8740
7	8480	8462	8466	8559	8655	8588
8	8367	8297	8312	8434	8519	8458
9	8316	8208	8237	8363	8433	8458
10	8233	8114	8165	8281	8382	8367
11	8129	8104	8154	8261	8323	8260
12	7782	7725	7759	7836		8278
13	7642	7652	7602	7677		8140
14	7550	7556				8120
15						8170

## Full line lengths Pasha 5-42

All lengths are measured from the loop of the main line up to the attachment point on the canopy. Brake lines are measured from the main brake line up to the trailing edge.

Center	A	B	C	D	E	Brakes
1	9060	8920	9001	9183	9365	10268
2	8969	8830	8909	9090	9260	9844
3	8982	8848	8922	9106	9270	9648
4	8970	8845	8914	9089	9247	9378
5	8904	8784	8844	9012	9166	9307
6	8932	8816	8869	9035	9185	9139
7	8839	8824	8831	8925	9023	8980
8	8722	8650	8669	8793	8884	8844
9	8674	8559	8592	8721	8793	8847
10	8589	8466	8519	8636	8746	8749
11	8487	8458	8513	8623	8690	8641
12	8116	8054	8093	8174		8658
13	7969	7982	7926	8007		8523
14	7870	7880				8503
15						8555

## Check-intervals

A new MAC PARA paraglider must be given a check every 24 months. With intensive use (> 100 flying hours per year, or excessively demanding use) an annual check is needed, after the first check.

## Personnel authorized to carry out checks

A valid flying license and training course by National association are the basis for permission to carry out paraglider checks

## Identification of glider

An identity sticker with details of certification and serial number is attached to the glider.

## Components of the check

### Porosity

The porosity should be checked with a porosity meter (JDC). Compare the resultant data with the producer's manual. Porosity measures should be taken on at least three points of both the top and bottom surface. The first point should be placed 20-30 cm from leading edge in the middle of canopy. Second and third points are placed left and right from first measure point at 25% of the span. One additional measurement should be made on the top surface of the wing tip.

The identified time should be higher than 30 second (JDC). In the event of the result being less than 30 seconds, the result of the check is a fail.

### Overall strength check

The check of canopy strength should be made with a Bettsometer (B.M.A.A approved Patent No. GB 2270768 Clive Betts Sales). On the top and bottom surfaces make small holes with a needle at the Aline attachment points. The exact verification should be made in accordance with the Bettsometer user manual.

### Line strength check

Line strengths should be as specified in accordance with the certification requirements. One main line should be taken from each array and have its strength checked with a tension-meter.

Required strengths should be higher than:

- A + B main lines x measured value > 8 x maximum take-off weight and higher then 800 kg for the A + B arrays.
- C + D mean lines x measured value > 6 x maximum take-off weight and higher then 600 kg for the A + B arrays.

Replacements for damaged lines must be with new original lines. Line lengths are taken from the lines data page.



## Line length measurement

Lines should be separated and each line measured under a tension of 5 kg. Measurement is made from the line karabiner to the canopy according to the method of certification. Rib numbering begins in the middle of canopy and leads to the wing tip.

Measured full lengths should be documented in the inspection record and are compared with certified full line lengths protocol. Lengths should not differ by more than 20 mm. The opposite sides should be checked for symmetry.

## Canopy line-attachment points check

Attachment points should be checked for damage and stretching. Defects, loops and flares should be repaired.

## Canopy fabric check

Ribs, diagonal ribs, top and bottom surface should be checked. Any damage to sewing or tears to the fabric, which could influence flying characteristics must be repaired.

## Lines

All lines should be checked for tears, breaks any damage to the sheath or signs of wear. Special attention should be paid to the sewing of the line loops. Damaged lines must be replaced.

The results should be documented in the inspection record.

## Connector check

All line carabineers, trimmers (if used), speed systems and pulleys should be inspected for visible damage. Open or improperly secured connectors should be secured in accordance with the producers recommendations.

## Risers

Both risers should be checked for tears, signs of wear or any damage and measured with a pull of 5 daN strength. Measured data should be documented in the inspection record. The difference must not be higher then 5 mm when compared to specified lengths.

## Final check

The glider sticker and check sticker must be inspected for readability and correctness. The check must be documented with date, signature and stamp on the canopy and in the user manual.





# TEST FLIGHT CERTIFICATE

Paraglider type: **PASHA<sup>5</sup> – 4 2**

Serial number: . . . . . — . . . . .

Test flown on: \_\_\_\_\_  
by  
**MAC PARA TECHNOLOGY**

Confirmation by dealer: \_\_\_\_\_

## Technical data

<i>Biplace</i>		Pasha 5	Pasha 5
Size		39 (M)	42 (L)
Zoom flat	[%]	95,7	100
Area flat	[m <sup>2</sup> ]	39,17	42,50
Area projected	[m <sup>2</sup> ]	35,07	38,05
Span flat	[m]	14,54	15,15
Span projected	[m]	12,21	12,72
Aspect ratio flat	-	5,4	5,4
Root cord	[m]	3,36	3,50
Cells	-	54	54
Weight	[kg]	8,65	8,7
Weight range *	[kg]	110-190	130-220
Min. speed	[km/h]	23-25	23-25
Speed Trimmers closed	[km/h]	36-38	36-38
Speed Trimmers open	[km/h]	45-47	45-47
Glide ratio	-	9,7	9,3
Min. Sink rate	[m/s]	1,05	1,10
Certification with trimmers	-	EN - B	EN - B
Weight range paramotoring	[kg]	173-253	196-296



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