



# **Owners Manual Rock 3**

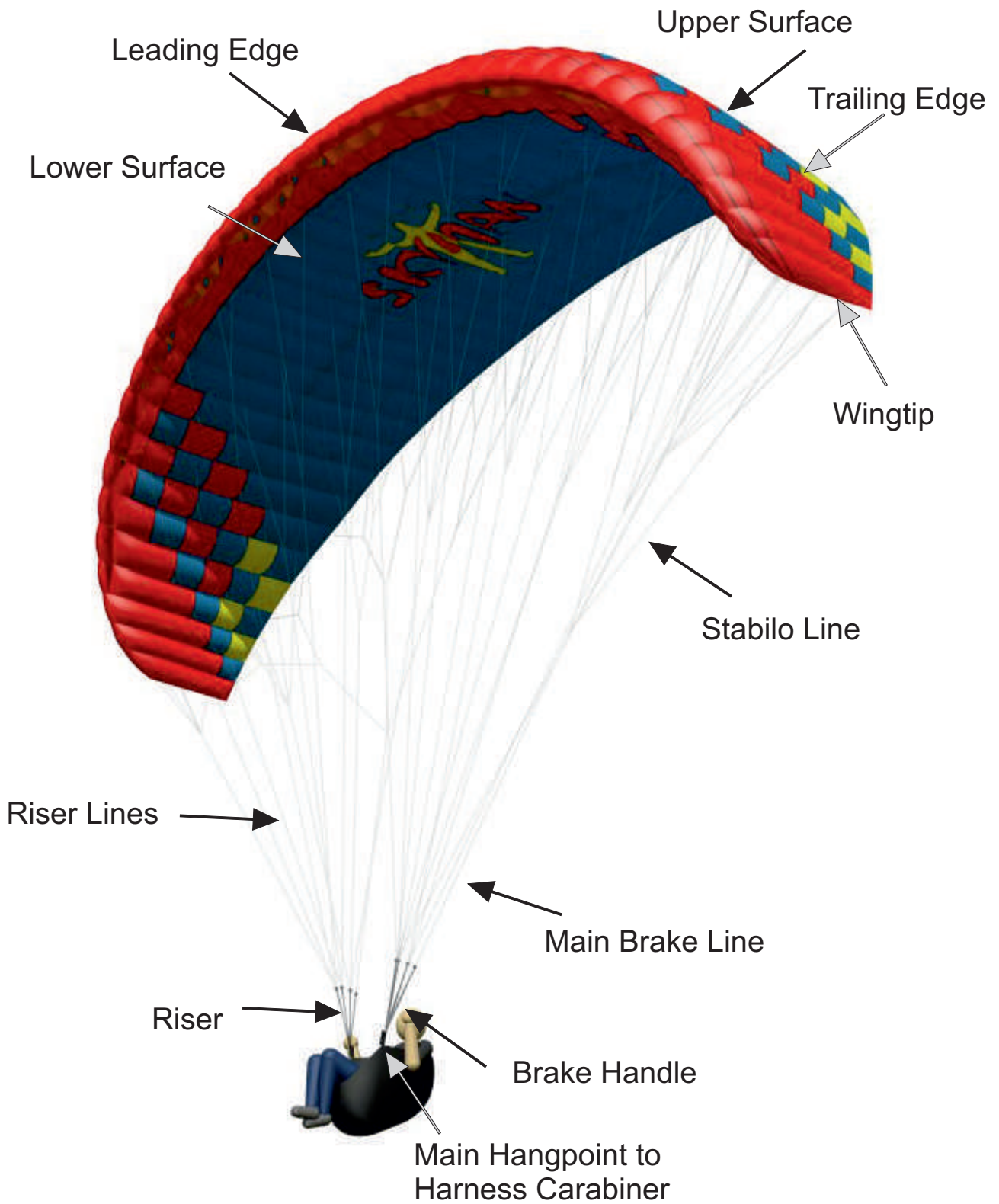
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**Technical Drawing:**





## 1. Dear Skyman Pilot

We are delighted to welcome you to the Skyman family of paraglider pilots. The Rock 3 has been designed for beginners looking for very good performance, high speed range and good handling without compromising on safety.

Like every paraglider, the Rock 3 also has its own character and wants to be flown in its own way. In order to give you the greatest flying pleasure, we have created the following operating manual.

## 2. Important Notes:

### **Reading this owner's manual is mandatory!**

The paraglider must not be put into use without careful study of this manual in order to avoid operating errors. We hereby explicitly point out that no liability can be accepted for possible consequences of improper handling.

This paraglider is a "light air sports glider with an empty mass of less than 120 kg" in the paragliding sector. At the time of delivery, it complies with the provisions of the German Airworthiness Requirement LTF NFL 2-565-20 and the European Standard EN 926-2:2015-06, Category A in all sizes.

New gliders must be flown in by the seller. This flight has to be confirmed with date and signature on the attached measurement protocol and on the type label of the paraglider.

Any unauthorized modification to the paraglider will invalidate the type approval!

The pilot is responsible of the airworthiness of his glider! It is also the pilot's responsibility to ensure that all legal regulations necessary for the operation of this glider are met (e.g. pilot license, insurance, etc.).

It is presupposed that the abilities of the user correspond to the requirements of the device!

The use of the paraglider is at your own risk! The liability of the manufacturer or distributor is excluded!

The following owner's manual has been compiled to the best of our knowledge and belief. However, it is quite possible that different aspects may change in the course of time due to (flight) technical innovations or changed approval tests and/or teaching methods. Therefore it is advisable in any case to obtain "updates" in suitable form about possible changed opinions and tests either from us or from the appropriate authorities.

## 3. Target group:

The Rock 3 is classified as a single-seater in category A according to LTF NFL 2-565-20 and EN 926-2:2015-06.

According to EN926-2:2015-06, the flight characteristics of this class are described as follows: „Paragliders with maximum passive safety and extremely forgiving flying characteristics. Gliders with good resistance to departures from normal flight.“

The required pilot skills are described as: „Designed for all pilots including pilots under all levels of training.“

The suitability of the Rock 3 for your own flying purposes and ability should always be discussed in person with your dealer.

We recommend every pilot to do a safety training and to play as much as possible with his glider on the ground. Perfect control of the glider on the ground and in the air is the key to maximum flying fun and the best insurance for accident-free flying.



## **4. Technical Description:**

### **Canopy construction:**

The Rock 3 is made from lightweight, double-coated Dominico 10D nylon fabric and fabric from NCV Industries. A reinforcing thread net is woven into these synthetically manufactured fabrics, which prevents tearing and increases the tensile strength at the seams. The coating makes the fabric water-repellent, UV-resistant and impermeable to air.

The Rock 3 consists of 38 cells. The wing tip (stabiliser) is pulled downwards and seamlessly integrated into the canopy.

The canopy is ventilated through openings on the underside of the profile nose. Cross ventilation is provided by precisely dimensioned holes (cross ports) in the profile rib.

Each load-bearing profile rib is suspended from line connections. These are reinforced in the profile. Tension bands are sewn in between the individual groups of main lines to regulate the sail tension.

Reinforcements are sewn into the nose of the profile to ensure a high degree of shape retention and stability.

A low-stretch tape is sewn into the leading and trailing edge, which ensures a sophisticated distribution of tension across the canopy, calculated by our design software.

### **Suspension System:**

The lines of the Rock 3 are made of polyester-coated aramid and polyester-coated PES / Dyneema, depending on the installation location. The strength of the individual lines depends on the installation location and varies from 65 to 280 daN.

Depending on the installation location, the lines are divided into gallery lines (at the top of the canopy), middle lines (between gallery and main lines), main lines (at the bottom of the riser), stabiliser lines (at the wing tip), brake lines (at the top of the trailing edge) and main brake lines (at the brake handle).

The lines are divided into A / B / C / D levels and brake lines and are colour coded for easy identification.

The riser of the Rock 3 has 3 risers on each side.

The A riser is divided into a main riser A, in which 2 main lines are suspended on each side, and a secondary riser A', in which one main line is suspended.

The B riser holds 3 B mainlines plus 1 stabiliser line and the C riser holds 3 C main lines.

The main brake line is guided to the brake handle via a pulley on the C riser.

There are no adjustable devices.

The line arrangement and the article designation are shown in the single line diagram.

### **Acceleration system:**

The Rock 3 has a foot acceleration system that automatically returns to the original position after use. The riser does not have a lockable trimmer.

The acceleration system shortens the A and B risers and reduces the angle of attack of the canopy. In normal flight all risers have the same length (53 cm with link).

The A-risers are shortened by up to 16,5 cm and the B-risers by up to 12 cm when the acceleration system is operated.

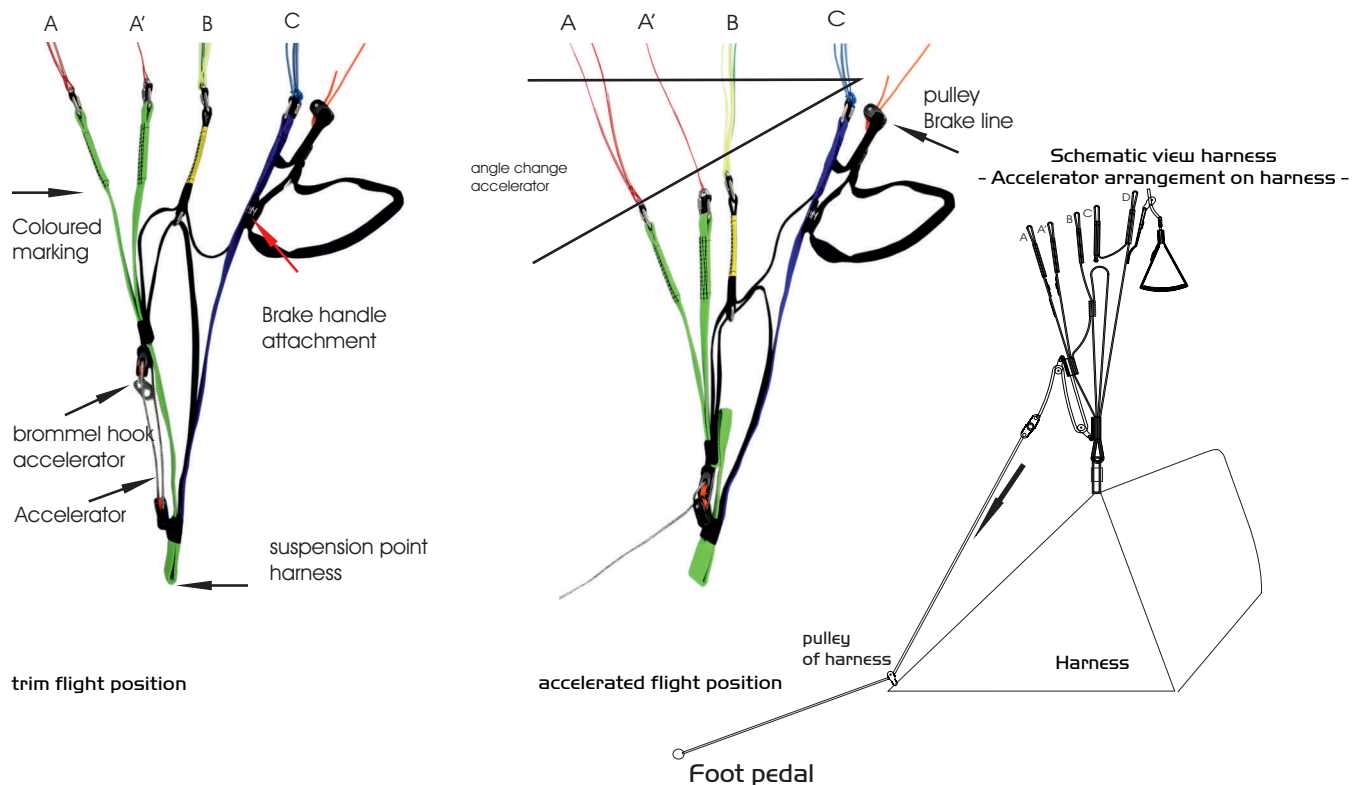
The C-risers are not shortened.



## Functionality and handling:

Before take-off, the brummel hooks are hooked into the brummel hook of the acceleration system of the harness's foot accelerator. Make sure that the suspended accelerator is running freely. The length of the foot accelerator must be set correctly before using it for the first time. This is done best in the simulator. The length is set correctly if the accelerator rope still has some slack and is not under tension when the accelerator is not in use.

## Overview risers:



By operating the foot accelerator the pilot shortens the A/B belts by a pulley system which reduces the force.

## 5. Technical Data:

size		XL - 32	L - 29	M - 26,5	S - 24	XS - 22
Flat surface	m <sup>2</sup>	32	29	26,6	24	22
Flat span	m	12,33	11,74	11,25	10,68	10,22
Flat aspect ratio	A/R	4,75	4,75	4,75	4,75	4,75
Projected surface	m <sup>2</sup>	27,22	24,67	22,31	20,41	18,71
Projected span	m	9,62	9,15	8,50	8,33	7,97
Projected aspect ratio	A/R	3,39	3,39	3,39	3,39	3,39
Min take off weight	Kg	100	80	75	60	50
Max take off weight	Kg	135	115	105	90	75
Min recommended TOW	Kg	105	85	80	65	55
Min recommended TOW	Kg	130	110	100	85	70
V-Trim	Km/h	37	37	37	37	37
V-Max.	Km/h	52	52	52	52	52
LTF / EN Category		A	A	A	A	A



Changes of these data are possible!

## **6. Harness**

The Rock 3 has been tested according to EN 926-2:2013 with harnesses of the following dimensions:

Weight range up to 80 kg:	40 (+/-2) cm chest strap width, 40 cm (+/- 1) cm suspension height
Weight range 80 to 100 kg:	44 (+/-2) cm chest strap width, 42 cm (+/- 1) cm suspension height
Weight range over 100 kg:	48 (+/-2) cm chest strap width, 44 cm (+/- 1) cm suspension height

## **7. Checking the paraglider:**

Every paraglider delivered is checked and measured several times by us before delivery. Nevertheless, we recommend that you check the new paraglider thoroughly according to the following points.

These instructions should also be followed if the paraglider has to be checked after intensive flight, hard manoeuvres or tree landings.

- The seams on the line suspension loops, on the risers and on the canopy must be checked for damage.
- Are all lines free of damage and correctly sewn?
- Are all line locks correctly screwed and the plastic inserts fastened?
- All the panels, including the ribs and V-tapes, must be inspected for cracks.

Any damage, however inconspicuous, must be inspected and repaired by an expert. A damaged paraglider is not airworthy!

## **8. Adjusting the steering lines:**

The two main steering lines lead to a multiple line branching, which are fixed at the trailing edge. At the risers the steering lines run through a guide pulley and each is connected with a handle. These control handles are attached to the risers with two snap fasteners during transport.

The steering line length is set correctly at the manufacturer and normally does not have to be changed.

The adjustment point is marked on the main steering line and provided with an additional sheathing of the line (chafe protection). It must have at least 5 cm of free travel in flight (before the brakes are taken hold of) and should not be altered. The improper change of the steering line length changes the flight behaviour and impairs the safety of the glider.

## **9. Flight operation:**

The following pages are not intended to be a guide for paragliding. Rather, we want to introduce you to the special features of the Rock 3 and give you some important information for flight and safety. Other special flight manoeuvres or configurations of the glider are not recommended.

### **9.1. Take-off preparations:**

A careful pre-flight check must be carried out before each take-off. The risers, lines and canopy must be checked for wear. It also must be ensured that the line links are tightly closed and secured against twisting with a plastic clip.

The harness must be put on with the greatest care. After putting on all buckles have to be checked again if they are closed correctly. The correct closure of the rescue system container and the correct fit of the rescue system handle must also be checked (see harness manual).

If a defect is found, do not take off under any circumstances!

The Rock 3 can best be started if it is laid out in an arch. When laying out, the canopy must be laid out against the wind.



Separate the lines and brake lines carefully and sort the risers. All lines must be free and without entangling or knots. There must be no lines under the canopy.

Once all preparations have been completed, the main carabiners of the harness are connected to the risers. Make sure that the carabiners are closed. When using a foot accelerator, the two brummel hooks are also to be connected. Make sure that the acceleration system is free and untwisted.

### **Checklist:**

#### **Paraglider:**

- Canopy without damage?
- Risers without damage
- Line links tightly closed?
- Lines without damage?
- all lines free and without entanglement and knots? Also brake lines?

#### **Harness:**

- Rescue system container closed?
- Rescue system handle correctly attached?
- all buckles and main carabiners closed?

#### **Take-off:**

- Helmet on?
- Risers not attached twisted?
- Speedsystem not attached twisted?
- Brake handle and correct riser taken up?
- Is the pilots position in the middle so that all lines are symmetrically tensioned?
- Is the wind direction okay?
- Obstacles on the ground?
- Air space free?

## **9.2. Take-off:**

The Rock 3 is very easy to launch. In general we recommend to use both A-risers (A and A') at the take-off. Depending on take-off technique, wind conditions and terrain, you can use alternatively only the middle A-risers to pull up the paraglider.

For better orientation, the different riser levels are marked in colour and text.

The pilot, who is ready for take-off, holds the A-risers and brake handles in his hands on each side and pulls the A-lines slightly. If the take-off area is flat and there is little wind, you can alternatively take a step back towards the canopy and pull up the paraglider with more impulse. During the take-off run, the arms are first stretched sideways to the rear in line with the A-risers and are guided upwards as the paraglider rises.

As with all gliders, the most important thing when launching is not the force but the constancy of the tension. As the Rock 3 is very easy to inflate, it needs to be braked on steep take-off areas or in strong winds to avoid overtaking the canopy.

When launching the glider backwards in strong wind, it is easy to prevent premature take-off by following the glider while it is being pulled up. The best preparation for perfect strong wind launches is still playing on the ground for hours in the wind.

## **9.3. Straight flight:**

The Rock 3 has a trim speed of 37 to 39 km/h depending on the wing load with fully released steering lines. In calm air the Rock 3 reaches the minimum flying speed (depending on the wing load) with about 55 to 60cm brake line pull. In turbulent air we recommend to fly with 5 to 15 cm pulled steering lines. The current angle of attack of the canopy is then higher and it is more difficult to undercut the air at the profile nose.

According to EN 926-2 the maximum symmetrical control travel is at least 55 cm for take-off weights up to 80 kg, at least 60 cm for take-off weights between 80 kg and 100 kg and at least 65 cm for take-off weights over 100 kg.

We understand all indicated cm values from the point where the trailing edge is pulled down, i.e. without the freewheel.





## **9.4. Accelerated flight:**

When the acceleration system is operated by the feet, the angle of attack of the canopy changes and the Rock 3 flies up to 16 km/h faster. Due to the higher speed the glider is more unstable and collapses more easily.

For safety reasons you should only fly accelerated in calm air with sufficient distance to the ground. Never let go of the brake handles during accelerated flying!

When flying into turbulence, the acceleration system must be deactivated immediately!

Pulling the steering lines during accelerated flight should also be avoided, as the nose will nod even more downwards for a short time due to the increased air resistance at the trailing edge and the danger of "undercutting" will increase and the glider can collapse violently.

If the glider collapses, the acceleration system must be deactivated immediately, then the canopy is first stabilized by the steering lines and then reopened.

## **9.5. Turns:**

The high agility of the Rock 3 is due to its special steering characteristics: It reacts very directly and without delay to control impulses.

By shifting the weight (the pilot leans on the inside of the curve), very flat curves can be flown with minimal loss of altitude.

Weight shifting and pulling on the inner steering line is suitable for fast changes of direction.

For thermal flying, the combination of weight shift, braking on the inside of the curve and controlled additional braking on the outside of the wing is best recommended. By pulling in the opposite direction and releasing (active flying) with the inner and outer brake, the curve radius and lateral position can be changed and the centering of the thermals can be optimised.

**Attention:** if the steering lines are pulled too far or too fast, there is a risk of stall!

A one-sided stall is clearly announced: the inner side of the wing curve becomes soft and the inner third of the wing almost "stops". If this flight condition has occurred, the inner brake must be released immediately.

## **9.6. Active flying:**

Active flying can prevent many collapses in advance!

Active flying means to fly the paraglider as stable and efficient as possible by shifting weight and steering impulses.

In turbulences and rough thermals the glider should always be held vertically above you by active flying with controlled brake inputs.

When flying into strong thermals, the angle of attack of the paraglider increases. If the brakes are released while flying into the thermals, the canopy can accelerate and remains almost above the pilot's head. The situation is different when flying into down winds: here the brakes are applied in a controlled manner.

## **9.7. Landing:**

The Rock 3 is easy to land. In the final glide against the wind the wing can be let out slightly braked. At a height of approx. 1 m above ground, the angle of attack is raised and intercepted by an increased braking level. The time of landing should coincide with the full use of the brakes.

If there is a strong headwind, the use of the brakes should only be very controlled in order to avoid a stall before landing!

On this occasion we would like to suggest not to reduce the altitude by the risky bad habit of "pumping" if the approach is too high.

Also landings with steep curves or turns in the final approach are to be avoided absolutely.

After the landing the wing should not fall on the ground with the nose first. This can destroy the profiles and impair the material in the leading edge area on the long run!





## **10. Winch towing:**

The Rock 3 is suitable for winch towing. We generally recommend using a towing aid for all paragliders, which activates the acceleration system during the towing process.

This towing aid accelerates the paraglider during the towing process and thus not only simplifies the take-off procedure but also reduces the risk of deep stall and enables higher release heights.

**Attention:** Paragliders which are damp and/or whose line lengths/air permeability values are no longer within the permitted tolerance have a significantly increased risk of deep stall when towing with a winch!

Winch towing is only permitted with a valid winch towing licence. The special features of a towing site and the equipment used (winch, towing release, etc.) should always be discussed with the winch operator and the take-off officer first.

We expressly point out that the equipment required for towing must also be certified in any case.

## **11. Powered flight:**

The Rock 3 is currently not certified for flying with a paramotor.

## **12. Extreme flight situations:**

### **12.1. Side collapse:**

A side collapse is probably the most common malfunction in paragliding. If the Rock 3 collapses in turbulent air, this usually only occurs in the outer wing area.

In order to maintain the flight direction in this flight condition, the opposite, open wing side has to be braked.

If the canopy collapses very hard, the braking of the open side may only be very dosed to avoid a stall.

After the turning away has been prevented by counter-steering, the canopy can be opened again at the same time by pumping on the collapsed side.

If the side collapse is not actively counteracted, the Rock 3 usually opens automatically within less than half a turn. If the canopy does not open automatically due to the strong turbulence or other influences (entangled lines), the paraglider will turn into a spiral dive.

### **12.2. Entangled lines:**

In the event of large collapses or other extreme situations, any paraglider may become tangled. The collapsed sections of the wing tip will get caught in the lines. Without pilot reaction the glider turns into a very strong spiral.

Once this has happened, the turning of the wing must be stopped first by a sensible counter-brake.

If the rotation speed should continue to increase despite counter-action, the rescue parachute must be released immediately at low altitudes.

If the height is sufficient, the following possibilities can be used to try to release the entangled wing tip:

- Try a sensitive counter-braking and a very fast, resolute and deep pulling of the steering line at the entangled side.
- Pull the coloured Stabilo line.

If these measures are not successful, you can try to release the entangled wingtip with a full stall if the height is sufficient.

#### **Attention:**

The flight manoeuvres mentioned above are very demanding and can cause high altitude loss! If the pilot feels overstrained or if there is not enough altitude, the rescue system must be activated immediately!



### **12.3. Front stall:**

The collapse of the entire leading edge is usually caused by strong pulling on the A-risers, accelerated flying or sudden strong turbulence. Although this flight disorder looks spectacular, it is often not dangerous if the collapse depth is low. Often there are no turning movements, the glider usually opens quickly by itself and quickly picks up speed again. The opening can be accelerated by braking in a controlled manner on both sides.

Timely recognition of the situation and quick reaction by braking on both sides helps to keep the loss of altitude as low as possible and not to lose control of the malfunction.

### **12.4. Deep stall:**

In a deep stall, the paraglider has no forward speed and at the same time has greatly increased sink rates. Deep stall is caused by flying too slowly when using the brake lines, trim changes, old and porous canopy, damage to the lines or ribs, pulling on the rear risers or improper take-off weight. Also, if the canopy is wet or the air temperature is very low, the tendency to stall increases.

Flying in the rain should be avoided as far as possible, as the raindrops on the canopy increase the  $V_{min}$  and thus the tendency to stall increases. Also very low temperatures can be problematic. In both cases, especially when the brakes are applied and/or the line geometry is no longer trimmed correctly.

If the glider is in a deep stall, you can recognize this by the fact that the noise is very low and the glider is in an unusual position above the pilot. In this case it is absolutely necessary to release the steering lines!

If the canopy and lines are in good condition, the Rock 3 will automatically pick up speed again within 2 to 3 seconds. If, for whatever reason, this is not the case, the A-risers must be pushed forward or the acceleration system must be activated.

If a glider has been in a continuous stall for no apparent reason (e.g. wet glider, flight in rain or inadmissible take-off weight), it must be checked before the next flight.

**Attention:** The brakes must not be applied in deep stall flight, as the paraglider immediately enters the full stall. A stable stall may no longer be released near the ground due to a possible pendulum movement. Instead, the pilot prepares himself for a hard landing, if possible with a landing fall.

### **12.5. Full stall:**

To initiate a full stall, both brake lines must be pulled through completely. When the stall speed is reached, the canopy empties abruptly and suddenly tilts backwards.

It is very important, despite the unpleasant reaction of the glider in a full stall, to keep the steering lines pulled through until the empty glider comes back over the pilot (approx. 3 to 6 seconds) and stabilizes in this position.

Only now the steering lines are reasonably fast (switching time  $\geq 2$  sec) and symmetrically released. The optimal recovery should take place in 2 phases: 1. prefilling of the canopy (slow release of the brakes up to shoulder height) until the canopy is fully open again; 2. recovery (braking to 0%).

If the canopy is released too quickly or asymmetrically, the result may be a large collapse or front stall.

**Attention:** A wrong, too early, asymmetrical or too fast released full stall can result in an extremely wide forward movement of the canopy! In extreme cases under the pilot!

### **12.6. Spin:**

By stalling one side, the flow can break off at half of the wing. This reverses the direction of air flow. The trailing edge, which is deeply braked, is then streamed from the back and flies in the opposite direction and the canopy rotates around its vertical axis.

There are 2 causes for a spin:

- A brake line is pulled through too quickly and too far (example: initiating a spiral dive).
- in slow flight one side is braked too much (example: in thermal circling)



If an inadvertently initiated negative turn is immediately released, the glider returns to normal flight without great loss of altitude. If the negative turn is held longer, the glider can accelerate and shoot forward on one side. This can result in an impulsive collapse or entanglement.

## **12.7. Wingover:**

Tight turns to the left and right are flown alternately. The cross slope is progressively increased. If the dynamics and lateral position of this flight manoeuvre is too high, the outer wing can relieve the load. If the lateral inclination is further increased and the reaction is wrong, the result may be an impulsive, large-scale collapse.

**Full stall, spin and wingover on all paragliders can have life-threatening consequences!!**

## **12.8. Emergency steering:**

If the steering lines fail, the "Rock 3" can easily be steered by using the rear risers. The distance to the stall is of course much shorter when steering with the rear risers than with the steering lines, it is about 10 - 15 cm with the "Rock 3". You can also fly light curves by pulling the Stabilo lines or by weight shifting.

## **13. Decent aids:**

### **13.1. Spiral dive:**

The spiral dive is the most efficient way to descend quickly. However, it puts a lot of strain on the equipment and the pilot.

It is important to remember that, depending on your condition, the outside temperature (cold!) and your rate of descent, you may lose consciousness sooner or later. Many pilots slow down their breathing during a spiral or switch to pressure breathing, which increases the risk of losing control. At the first sign of dizziness, loss of consciousness or loss of vision, the spiral must be stopped immediately.

The spiral dive is initiated by carefully pulling the brake line on one side and shifting the weight to the inside of the turn. Due to the direct handling, the Rock 3 quickly takes on a high bank angle and flies a steep turn. As soon as the wing is in front of the pilot (nose up), an impulse is created which the pilot should follow by shifting his weight to the outside of the turn.

The sink rate and pitch of the spiral are increased by a controlled pull on the brake line inside the turn. Light braking on the outside of the turn will prevent the outer wingtip from collapsing.

To recover from the spiral dive, slowly release the brake on the inside of the turn.

Rapid recovery means that the high airspeed (up to over 100 km/h) is converted into height in a strong pendulum motion. This results in extreme deceleration at the end of the pendulum movement, followed by a canopy stall. You must also be prepared to be caught in your own wake vortex (rotor)!

Due to the extreme loss of height in the spiral dive, it is always important to ensure sufficient safety height!

**Attention:** Almost every paraglider reaches a sink rate where the glider is pointing downwards ("nose down") and remains in this position even when the brake lines are released, continuing to spiral (stable spiral dive).

The Rock 3 has been classified as B according to EN 926-2:2013. However, under unfavourable conditions the reactions may be more severe than described in this classification. The causes can be complex.

For example: harness geometry (suspension height), cross straps, turbulent air, holding on to the riser, shifting the pilot's weight to the inside of the turn, etc.

Should a stable spiral dive occur unexpectedly, it is released by shifting the pilot's weight to the outside of the turn and applying controlled counter-braking.

**Caution:** In a stable spiral dive, extreme G-forces can affect the body and require a lot of physical strength!



## **13.2. Big Ears:**

The 'big ears' manoeuvre is a simple but not very effective method of descending where the forward speed is greater than the rate of descent. It is more suitable for reducing the glide angle and gaining horizontal distance from a hazard than for a rapid descent.

Big Ears" is performed by pulling the outer A-risers (A') and folding both wingtips symmetrically downwards.

Big Ears can increase your sink rate to around 5m/sec and reduce your glide angle.

The speed bar can be used to increase the sink rate and forward speed. To exit this manoeuvre, simply release the outer A-risers. The wingtips of the Rock 3 will normally open automatically. The pilot can apply a little brake to speed up the opening.

**Caution:** Never perform a spiral dive with big ears, as the centre A-lines will be loaded beyond their limits.

## **13.3. B-Stall:**

The B-stall is easy to achieve with the Rock 3. The B-risers are pulled down slowly and symmetrically to 20cm. The airflow stops and the glider descends vertically.

To get out of the manoeuvre, simply raise the B-risers again in about 1 second.

If the glider starts to rotate or forms a collar during the B-stall, the manoeuvre must be released immediately. The causes can be as follows: Spin: asymmetric pull on the risers, 1 B-riser and 1 C-riser down; Collar: excessive pull on the B-risers.

## **Summary:**

All descent aids should only be practised in calm air and at a safe height, preferably as part of a safety training course, so that they can be used in an emergency.

This is valid for all extreme flight manoeuvres and descent aids:

- first practice only under the guidance of a flight instructor or as part of a safety training course
- before starting the manoeuvres, ensure that the airspace under the pilot is free
- During the manoeuvre the pilot must have eye contact with the canopy and constantly check the altitude.

## **14. Folding, Care, Storage, Repairs, Maintenance, Disposal**

The condition of your paraglider affects your life in the air. A well maintained glider can last twice its age. To ensure that the Rock 3 will carry its pilot safely through the air for as long as possible, please consider the following points:

### **Folding:**

To prolong the life of the glider, and to avoid unnecessary kinking of the nylon rods in the nose area, we recommend that you fold the glider profile on profile (similar to an accordion), or roll it up loosely as seen from the stabiliser (without kinking the nylon rods). Incorrect packing and prolonged storage may cause deformation of parts inside the glider.

### **Care:**

- The sun's UV rays will damage the paraglider's fabric over time. Therefore, do not expose your paraglider to sunlight unnecessarily.
- When unfolding the glider, ensure that the canopy and lines are not heavily soiled. Dirt particles can damage the fabric.
- After tree and water landings the line lengths should be checked.
- Do not drag the glider across the ground. The coating of the fabric will be damaged.
- Moisture damages the coating of the fabric and shortens its life.
- If the lines stick to the ground, they can be overstretched or torn during launch.
- Do not step on the lines!



- When folding the sail, place the supplied fabric bag underneath to prevent mechanical abrasion and damage to the sail.
- The lines should have as little bending as possible.
- After contact with salt water, rinse the equipment immediately with fresh water!
- Insects that get lost in the cells should be removed alive, not only for the love of animals, but also because they secrete a corrosive fluid.
- Clean the glider with water only. Avoid mechanical stress such as brushing or rubbing. Chemical cleaners will damage the fabric and lines.

### **Storage:**

- Always store your paraglider in a dry place. If it gets wet, lay it out to dry as soon as possible (but not in full sunlight!).
- Do not store the glider near chemical fumes or gases.
- During transport and storage, especially in a car, ensure that the paraglider is not exposed to unnecessarily high temperatures.

### **Repairs:**

- Smaller tears in the fabric that do not run along the seam can be temporarily repaired with an adhesive sail from a paraglider dealer.
- All other types of damage, such as large tears, torn seams, torn line hang points, torn and damaged lines should only be repaired by an authorised workshop or the manufacturer.
- Only genuine spare parts should be used. A list of the lines used in the paraglider model can be found in the individual line plan under point 16 "Individual line lengths". The lines can only be purchased from the manufacturer.
- Any modifications to the paraglider, other than those approved by the manufacturer, will invalidate the certification of the equipment.

### **Maintenance:**

- The Rock 3 must be inspected by a qualified workshop or the manufacturer at least every two years or every 100 hours of operation.
- A line measurement should be made every 20 hours of flight and compared with the data sheet.

### **Disposal:**

- The materials used in a paraglider must be disposed of properly. Please return any used equipment to us. We will dispose of it properly.

## **15. Nature and landscape friendly behaviour:**

This should go without saying, but it is worth mentioning again:

Please practise our outdoor sport in a way that respects nature and the landscape.

Please do not stray from the marked trails, do not leave litter, do not make unnecessary noise and respect the delicate balance in the mountains.

Respect for nature is particularly important at the take-off site!



## 16. Line lengths

### Ageing of lines and trimming options

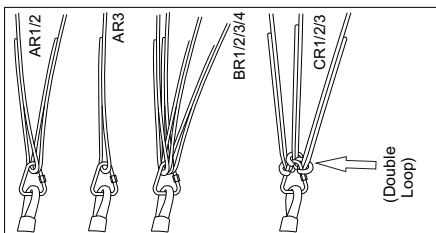
Until now, it has been assumed that lines stretch as they are used. In the case of the middle A and B lines - where the heaviest load is applied - this is even true.

All lines (both Kevlar and Dyneema) develop cracks in their thin threads and then begin to swell and shrink. The rear C-lines and the outer A, B, C-lines are only loaded with a few grams during flight. This causes the lines to shorten slowly - because there is not enough load on the lines to stretch them during flight. There is almost nothing that can be done about this from a technical point of view. The Rock 3 is equipped with a slightly faster trim (+mm to C) to avoid this shortening.

Less stressed lines are supplied with a trim knot. This can be used to lengthen the line if necessary.

The paraglider can now be easily trimmed by the paraglider service company or the pilot without having to replace the lines. The lines should be measured every 20 hours of flight and compared with the data sheet. It is normal for lines to shrink by up to 30mm when used intensively.

All line changes are gradual. They do not happen suddenly. They will not cause you to crash, but you will often only notice this if you are less able to fly against the wind or if the glider loses some of its performance.



Factory configuration with double loop on Br4 and CR lines for trimming during ageing

### Line names:

All lines in Skyman paragliders are named in the same way. When ordering replacement lines, please use the following explanation to identify the line type, and specify the glider type and size when ordering.

The first digit indicates the level of the line (A, B, C, D; K = brake). The numbering starts from the centre of the glider at 1 and continues to the stabiliser.

Top lines (upper level) are marked with the level and number from the centre of the glider. For example A 5 = the 5th A-line from the centre of the glider (for Rock 3 24 - S: 68,5 cm)

The top line of the stabiliser has an additional "e". Example B12E = B stabiliser line at the top of the glider (Rock 3 24 - S: 143 cm).

Middle lines (middle level) are marked with an "M". Example: BM3 = 3rd centre line from the centre of the glider in the B-level (Rock 3 24 - S: 196,5 cm).

The level between the middle lines and the top lines is labelled 'MU'. Example: CMU1 = 1st line from the centre of the C-level canopy (for Rock 3 24 - S: 93,5 cm)

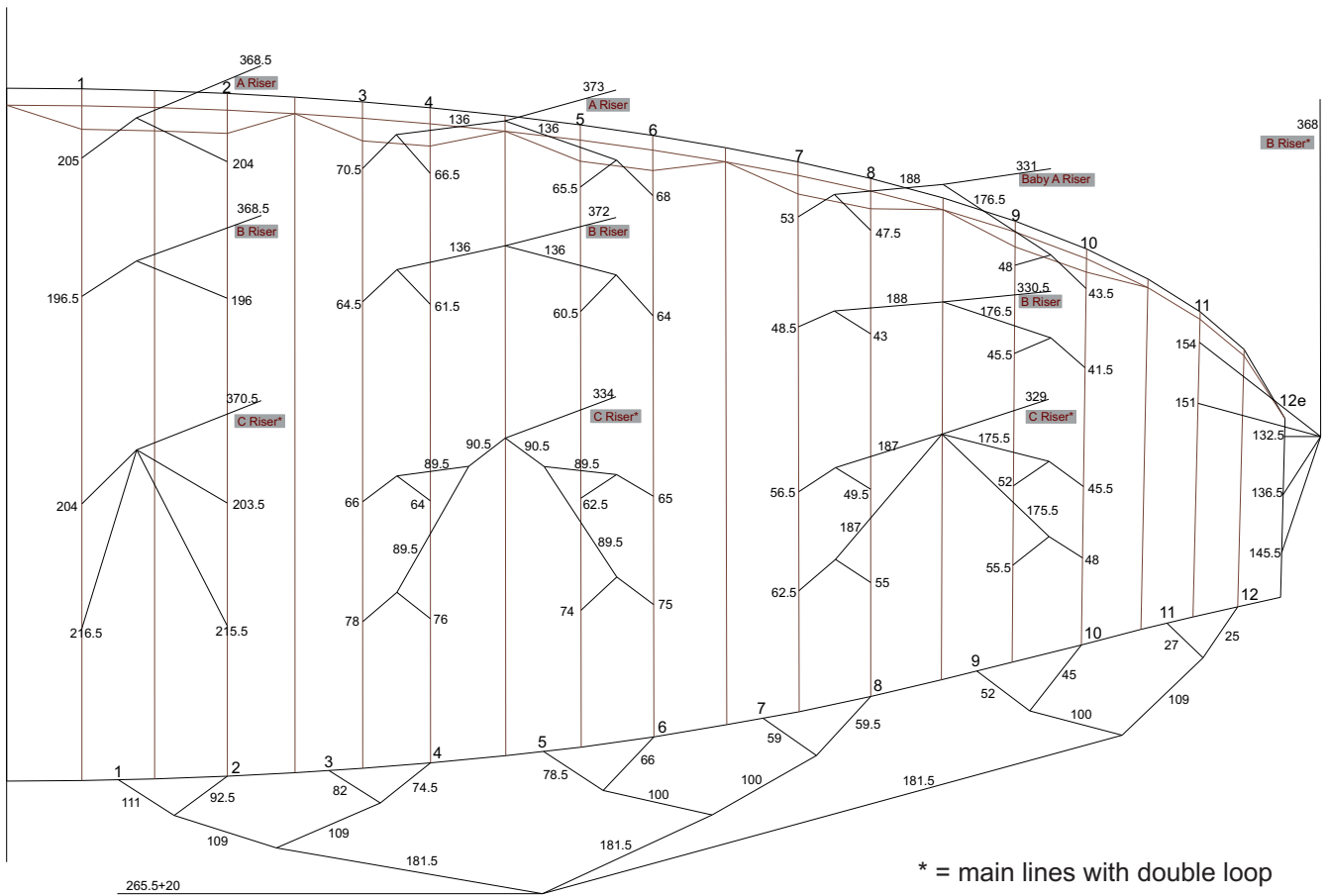
The main lines are marked with an additional 'R'. Example AR2 = 2nd A main line from the centre of the glider (Rock 3 24 - S: 390,5 cm)

Lines used for Rock 3:

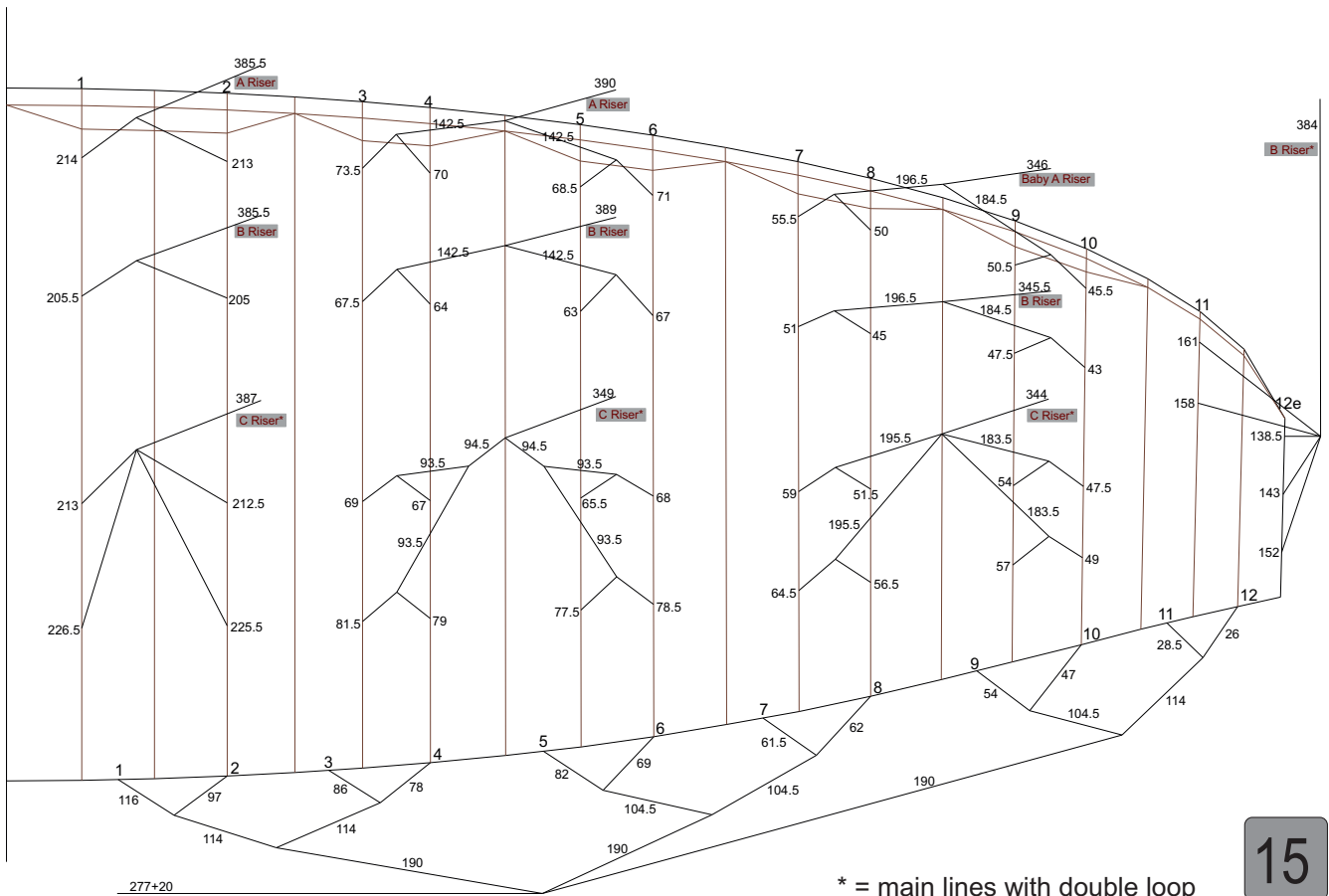
Name	A1 - A6	A7 - A10	B1 - B6	B7 - B10	C1-C10	D1 - D10	A11/12	B11-12, C11
Article	8000-135	8000-090	8000-135	8000-090	8000-090	8000-090	7343-075	7343-075
Name	AM1 - AM 2	AM3 - AM4	BM1 - BM2	BM3 - BM4	CM1 - CM4	DM1 - DM4	CL1 - CL2	
Article	8000-190	8000-135	8000-190	8000-135	8000-135	8000-135	8000-190	
Name	AR1 - AR3	BR1 - BR3	BR4	CR1, CR3	CR2			
Article	PPSL200	PPSL200	7343-140	7343-230	7343-280			
Name	K Riser	KL	KM	KTop				
Article	10-200	PPSL125	PPSL065	PPSL065				



## 16.1. Single line length Rock 3 XS - 22



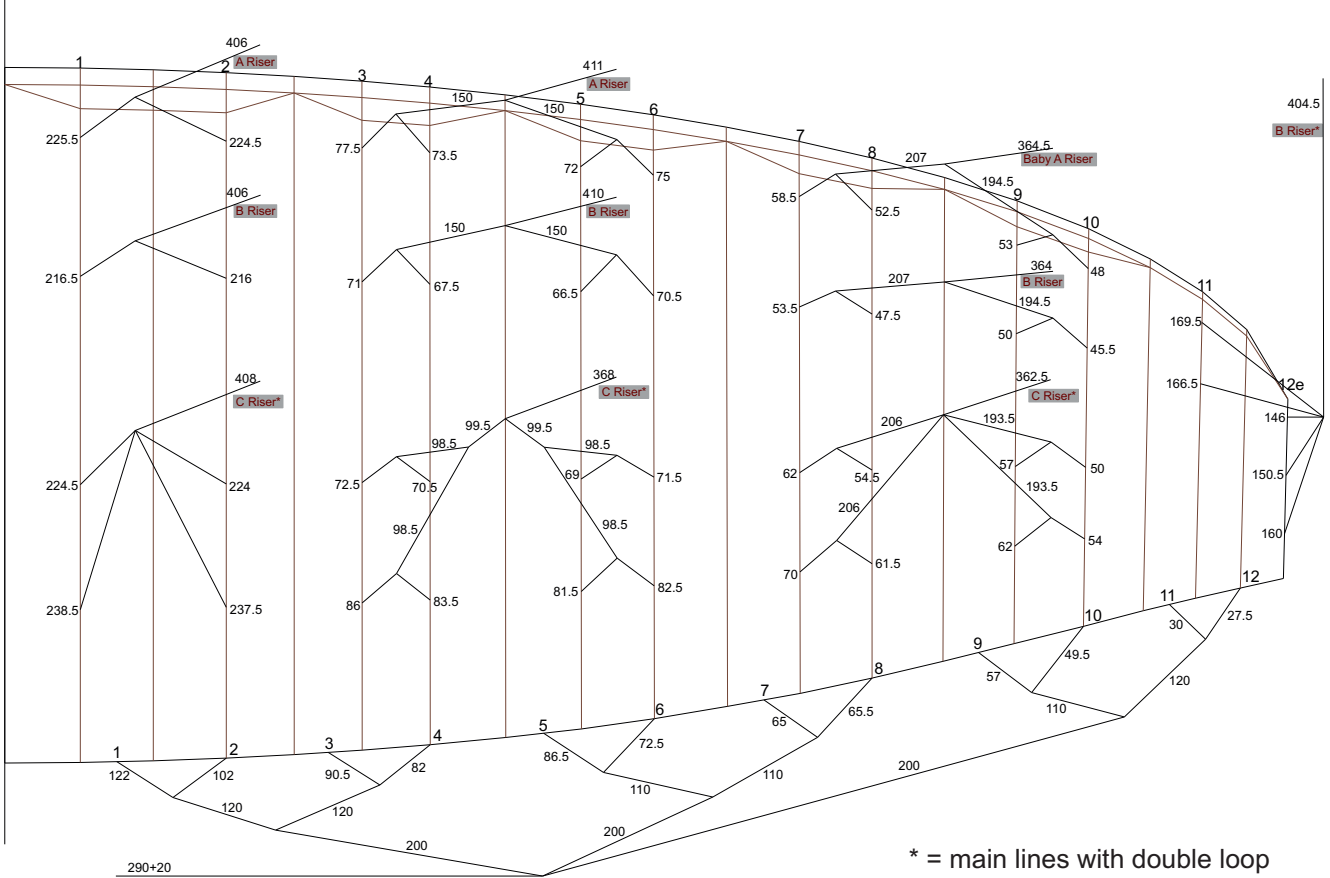
## 16.2. Single line length Rock 3 S - 24





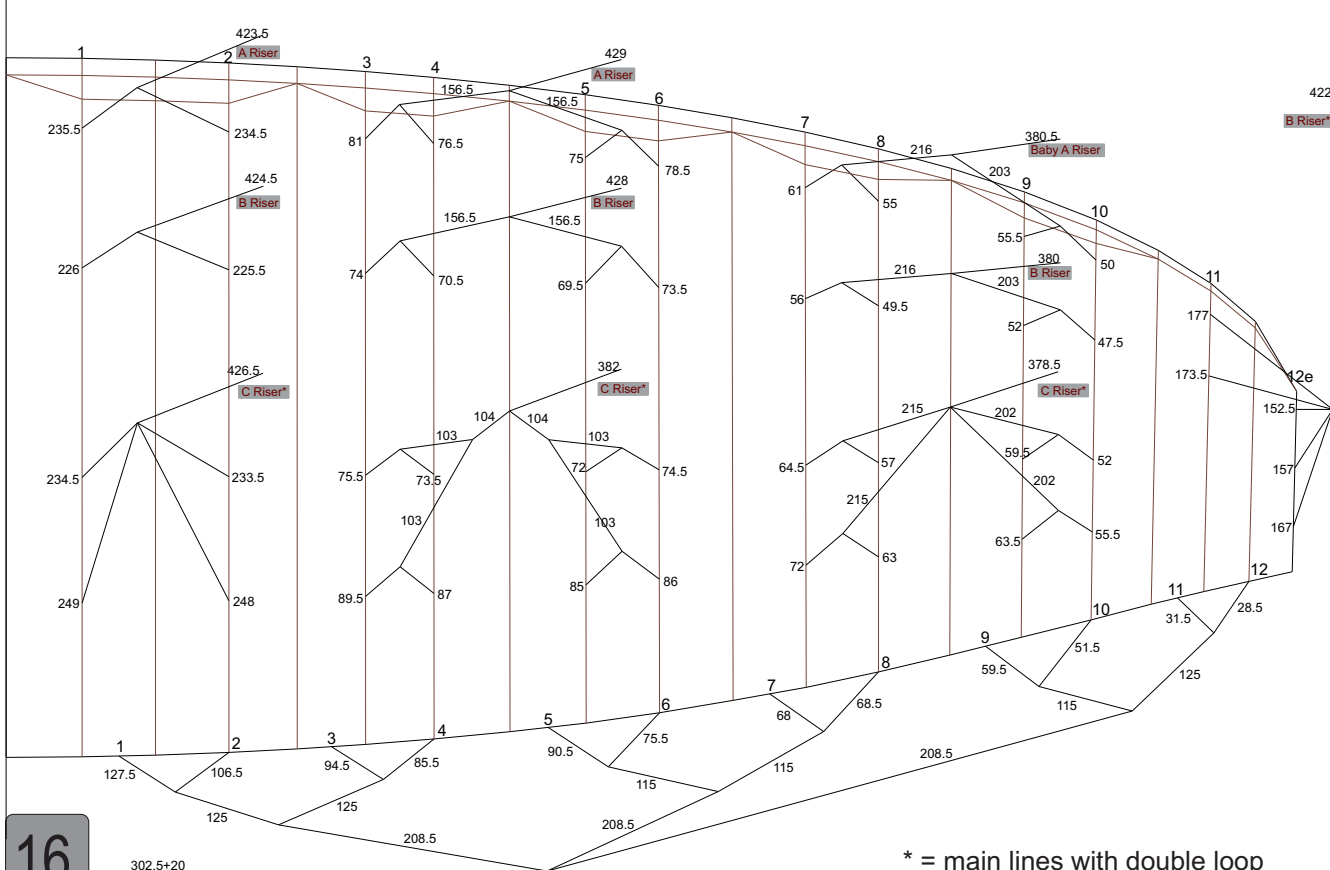


### 16.3. Single line length Rock 3 M - 26,5



\* = main lines with double loop

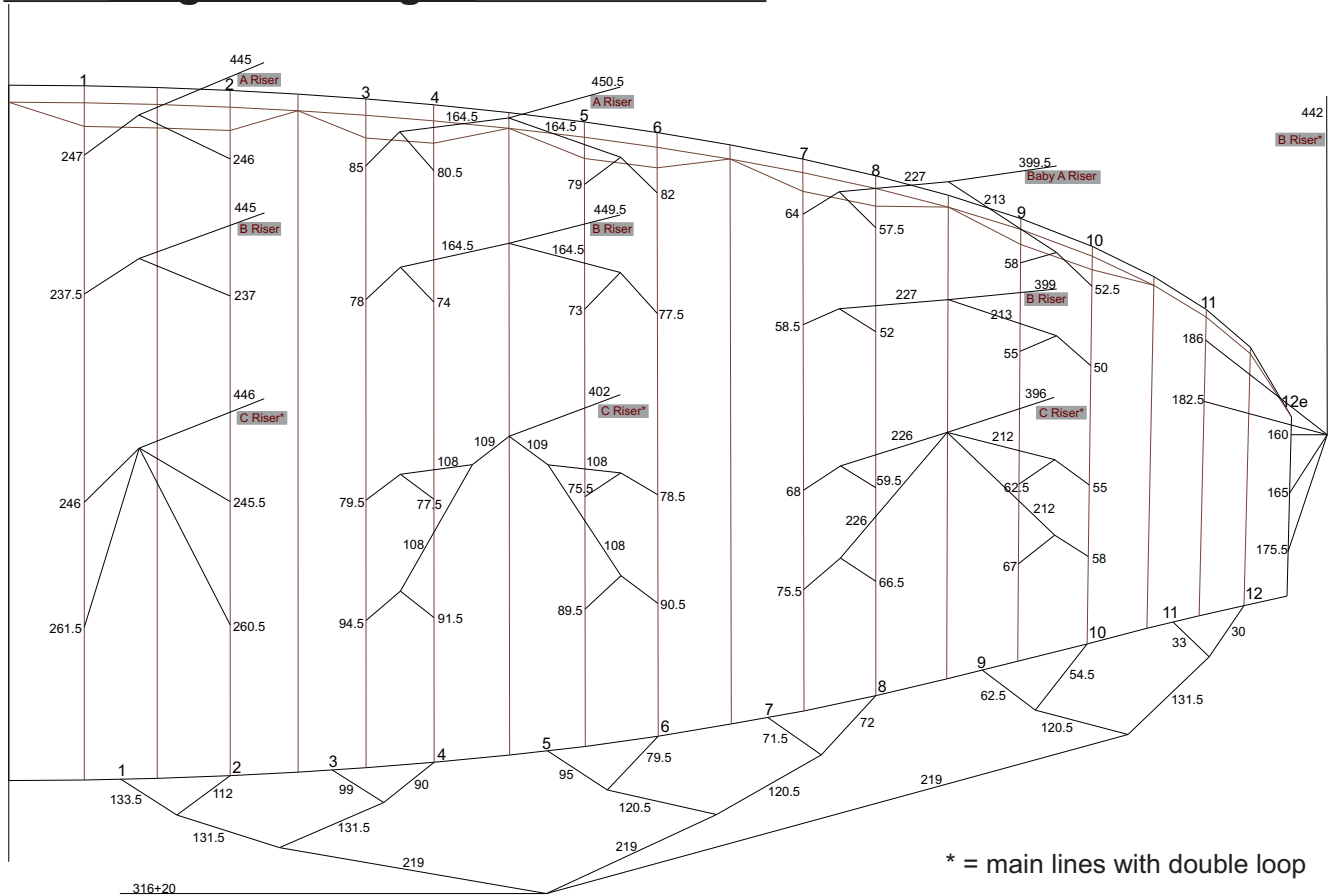
### 16.4. Single line length Rock 3 L - 29



\* = main lines with double loop



## 16.5. Single line length Rock 3 XL - 32



## 17. Overall line length

All line and riser lengths listed below are in accordance with EN 926-2:2013. The lengths given have been checked by the testing laboratory and are within the tolerances allowed by the standard.

Lengths measured from attachment point of riser to lower sail, brake lines to end of main steering line; under 50 N tension.

### 17.1. Overall line length Rock 3 XS - 22

in mm	1	2	3	4	5	6	7	8	9	10	11	12
A	6270	6260	6325	6285	6275	6300	6245	6190	6080	6035	5735	5520
B	6185	6180	6255	6225	6215	6250	6195	6140	6050	6010	5705	5560
C	6265	6260	6310	6290	6275	6300	6230	6160	6070	6005	5650	
D	6390	6380	6430	6410	6390	6400	6290	6215	6105	6030		
Brake	6670	6485	6380	6305	6255	6130	6060	6065	5990	5920	5830	5810



## 17.2. Overall line length Rock 3 S - 24

in mm	1	2	3	4	5	6	7	8	9	10	11	12
A	6530	6520	6590	6555	6540	6565	6505	6450	6335	6285	5975	5750
B	6445	6440	6520	6485	6475	6515	6455	6395	6300	6255	5945	5795
C	6520	6515	6570	6550	6535	6560	6490	6415	6320	6255	5885	
D	6655	6645	6695	6670	6655	6665	6555	6475	6360	6280		
Brake	6970	6780	6670	6590	6535	6405	6330	6335	6255	6185	6095	6070

## 17.3. Overall line length Rock 3 M - 26,5

in mm	1	2	3	4	5	6	7	8	9	10	11	12
A	6850	6840	6915	6875	6860	6890	6825	6765	6645	6595	6265	6030
B	6760	6755	6840	6805	6795	6835	6770	6710	6610	6565	6235	6075
C	6840	6835	6900	6880	6865	6890	6810	6735	6635	6565	6170	
D	6980	6970	7035	7010	6990	7000	6890	6805	6685	6605		
Bremse	7320	7120	7005	6920	6865	6725	6650	6655	6570	6495	6400	6375

## 17.4. Overall line length Rock 3 L - 29

in mm	1	2	3	4	5	6	7	8	9	10	11	12
A	7130	7120	7200	7155	7140	7175	7105	7045	6920	6865	6520	6275
B	7045	7040	7120	7085	7075	7115	7050	6985	6880	6835	6485	6320
C	7135	7125	7180	7160	7145	7170	7090	7015	6910	6835	6420	
D	7280	7270	7320	7295	7275	7285	7165	7075	6950	6870		
Bremse	7635	7425	7305	7215	7165	7015	6940	6945	6855	6775	6675	6645

## 17.5. Overall line length Rock 3 XL - 32

in mm	1	2	3	4	5	6	7	8	9	10	11	12
A	7455	7445	7535	7490	7475	7505	7435	7370	7235	7180	6805	6545
B	7360	7355	7455	7415	7405	7450	7375	7310	7200	7150	6770	6595
C	7440	7435	7500	7480	7460	7490	7405	7320	7210	7135	6700	
D	7595	7585	7650	7620	7600	7610	7480	7390	7255	7165		
Brake	8000	7785	7655	7565	7505	7350	7270	7275	7180	7100	6995	6965

## 17.6. Riser length Rock 3

mm	normal	accelerated
A	530	365
A`	530	365
B	530	410
C	530	530



## **18. Rock 3 Inspection Instructions**

The purpose of this inspection instruction is to ensure the flight safety of the paraglider to be inspected. In Germany it is legally based on the German Aircraft Inspection Regulations (LuftGerPV) and represents the minimum technical requirements for equipment and scope of inspection.

Depending on the country of operation, country-specific requirements may have to be observed. The minimum requirements must not be reduced.

Attention! Fly market GmbH & Co. KG is not liable for the work of the responsible person (or inspection company) who carries out the inspection. This person always works on his own responsibility!

If there is any doubt as to whether the check has been carried out correctly or whether the glider is airworthy, contact the manufacturer.

### **18.1. Scope of inspection**

- In Germany, air sports equipment is subject to inspection in accordance with LuftGerPV §13/2:  
"The airworthiness of the air sports equipment according to § 1 paragraph 4 of the air traffic licensing regulations must be checked by the owner or on his behalf according to the manufacturer's instructions.  
The owner is responsible for the timely and complete performance of the inspections.  
He shall immediately notify the manufacturer of any defect in the aircraft or in the test instructions".
- The inspections may be carried out by the manufacturer, by persons appointed by the manufacturer or by a person with sufficient expertise who meets the minimum personnel requirements specified in 18.3.
- In Germany, according to LuftGerPV §13/2, it is possible for the owner to inspect his aircraft himself. This is not recommended by the manufacturer. In most cases the owner does not have the necessary personnel and technical equipment (expertise, measuring instruments, etc.).
- If the inspection reveals a defect, the glider must not be flown again. Repairs must be carried out by the manufacturer or a person authorised by the manufacturer.

### **18.2. Inspection intervals**

The interval for training paragliders and commercial tandem paragliders is every 12 months, for all other paragliders every 24 months or after 100 hours of use, whichever is the sooner.

A line measurement should be carried out every 20 hours of flight and compared with the specification.

### **18.3. Personnel requirements for the inspection**

Personnel requirements for the inspection of paragliders used only for personal and single seater paragliders:

- A valid unrestricted paragliding pilot's licence or an equivalent approved licence.
- Sufficient knowledge of the paraglider to be inspected (e.g. type specific training provided by the manufacturer or importer).

Personnel requirements for the inspection of paragliders used by third parties and for two-seater paragliders:

Sufficient expertise to inspect paragliders. This should be evidenced by at least one of the following:

- Professional training conducive to this inspection activity
- Two years' professional experience in the manufacture or maintenance of paragliders and hang-gliders, or a technically similar activity.
- Sufficient type-specific training (e.g. manufacturer/importer training).

### **18.4. Documents required**

- Current version of the inspection instructions
- Data sheets



- Previous inspection reports (for further inspections only)
- Maintenance and calibration records for the measuring instruments
- Manufacturer's instructions for rectifying defects
- Airworthiness Directive if applicable

### **18.5. Test equipment**

The test equipment to be used for the individual test shall be the equipment listed below:

- Air permeability measuring device (porosimeter): JDC or equivalent
- Length measuring device: steel tape or laser measuring device
- Strength measuring device for lines according to EN926/1, 4.6.3: electronic measurement with minimum 100Hz sampling rate, load application speed between 0.7m/min and 1m/min.
- Fabric strength measuring device for canopy: Bettsometer, B.M.A. GB 2270768

All measuring equipment must be calibrated and serviced regularly in accordance with the manufacturer's instructions.

### **18.6. Test procedures**

#### **Identification of the equipment:**

- On delivery of the paraglider, an initial inspection is carried out and the paraglider is identified using the official manufacturer's documentation.
- Check that the type label and inscriptions are correct, complete and readable.

#### **Visual inspection of the canopy:**

- The upper and lower surfaces, leading edge, trailing edge, ribs (including any V-ribs), cell partitions, seams, flares and line loops are inspected for cracks, shearing, stretching, damage to the coating, repairs and any other abnormalities. The inspection result shall be recorded in the inspection report.
- In the case of tears in the seams and other damage, repairs must only be carried out using original spare parts and original seam patterns, no gluing of large tears with adhesive sail, use of non-original spare parts, etc.

#### **Visual inspection of the lines:**

- If the lines are damaged (seams, tears, folds, coating, chafing, thickening, core exits, etc.), they must be replaced immediately with original spare parts and original seam patterns.

#### **Visual inspection of the connecting parts**

- All line shackles, trimmers and speed systems should be inspected for any signs of damage, such as tears, chafing or stiffness. Both risers shall be inspected for shear points, tears and heavy wear.

#### **Measurement of line lengths/risers:**

- 
- The individual lines are laid out and loaded with 5 daN. The measurement is carried out from the suspension point of the riser to the canopy including the suspension line loop. The total line lengths determined are documented in the inspection report and compared with the set line lengths. Compliance with the tolerances specified in the manufacturer's instructions must be documented in the inspection report.
- Total lengths must not deviate by more than +/- 10 mm from the nominal values. The determined values must not represent a significant trim shift.



- For example, a trim shift is present when
  - More than 50% of the lines reach the tolerance limit, where the tolerance limit only deviates in either the + or - direction. (Example: A/B lines are 10 mm longer, while C/D lines are on target)
  - or 25% of the lines deviate from the tolerance limits in both directions (+ and -) (Example: The A/B lines are 5-10 mm longer, while the C/D lines are 5-10 mm shorter than the set values (typical "backward" trim shift due to aging).
- In the event of a trim shift, individual lines can be corrected by looping in or out to restore the correct condition (e.g. by looping in A-lines that are too long or looping out C-lines that are too short at the line lock). Once the correct trim condition has been restored, the absolute total lengths must not deviate by more than +/- 30 mm from the set values.
- Both risers shall be measured under a load of 5 daN. The measured values shall be compared with the specifications in the data sheet and recorded in the test report. A maximum difference of +/- 5 mm is allowed in the length of the risers.

### Control of line strength:

- The proof of line strength must be documented in the same way as required by EN926/1: 2016 or LTF 2-565-20 for the type test:

For the Rock 3, the lines are made from high strength Dyneema and Aramide. This means that a breakage test after the first 24 months can be omitted if the paraglider is in good overall condition in favour of uniform length ageing.

- Main line: From each line level (A, C, D) one main line is removed from the centre of the canopy and the breaking load is determined using the strength measuring device. The lines removed must be identified in the inspection report. This is important so that the line that was replaced in the previous test is not tested in a subsequent retest. During further retests the main lines on the opposite side or next to the centre main line are tested (i.e. AR2, CR2).
- Top lines/middle line level: Above the main lines an additional line is removed up to the canopy and the breaking load is also determined. If the determined breaking load of the A line is 1.5 times the nominal value (e.g. nominal value 50 daN, determined breaking load >75 daN), no further lines need to be tested on the B/C/D levels.
- Limits of each line for the Rock 3:

Line position	Limit (daN)
AR1- AR3, BR1 - BR3	143
BR4	50
CR1, CR3	89
CR2	102
CL1 - CL2	85
AM1 - AM2, BM1 - BM2	85

Line position	Limit (daN)
AM3 - AM4, BM3 - BM4	61
CM1 - CM4, DM1 - DM4	61
A1 - A6, B1 - B6	61
A7-A10, B7-B10, C1-C10, D1-D10	38
A11-A12, B11 - B12, C11	19

### Inspection of the canopy strength::

- Canopy strength is tested using the Bettsometer (B.M.A.A. approved Patent No. GB 2270768 Clive Betts Sales). In this test, a needle-thick hole is made in the upper and lower sails in the area of the A-line attachment and the fabric is tested for tear resistance. The limit of the measurement is set at 400g and a tear length of 5mm.
- The exact test procedure is given in the operating instructions for the Bettsometer. The measured value is recorded in the test report.



### **Inspection of the air permeability of the cloth:**

- Porosity is measured at a minimum of 5 points using a suitable porosimeter. The measuring points are distributed across the wing span approximately 20-30 cm behind the leading edge. At least 2 measuring points must be in the middle third of the canopy. The values obtained shall be recorded in the test report.
- Limits: No measuring point should be less than 15 seconds. If a measurement is less than 15 seconds, the glider is no longer airworthy.
- 

### **Visual Inspection of Trim and Adjustment:**

- All lines should be checked against the line plan to ensure that they are correctly configured up to the riser and that all line levels are clear.

### **Checkflight:**

- A check flight is only necessary after major repairs.
- The purpose of the check flight is to determine whether the flying characteristics of the glider have changed compared to a brand new glider.
- The inspector must have the flying skills and experience to be able to compare the design specifications with the flying behaviour of the paraglider being inspected and to identify any changes in performance. This includes in particular:
- He must also be familiar with the design regulations in force at the time of certification.
- A check flight must cover at least the following points: pull-up behaviour, stall tendency (B-stall recovery), tendency to make negative turns, control travel, >50% one-sided collapses.
- If the glider does not behave correctly in any way, it must not be flown and must be returned to the manufacturer for inspection. Under no circumstances should you attempt to remedy the fault yourself.

## **18.7. Documentation**

- All test results and details of the paraglider (type, size, serial number, year of manufacture) must be recorded in the inspection report. A sample report is available from the manufacturer.
- Repairs and maintenance are also recorded in the inspection report.
- The overall condition of the appliance is indicated according to the options to be ticked in the inspection report. All measured values such as strength, porosity, etc. are included in the overall condition.
- In the event of a negative test result, the manufacturer must be contacted to agree on further action (e.g. return of the unit to the manufacturer for repair).
- Any unusual defects must be reported to the manufacturer immediately!
- The inspection is marked on the unit next to the type label. This note must contain at least the time of the next inspection, place, date, signature and name of the inspector.
- All inspection documents (inspection report and measurement report) must be produced in triplicate. The owner of the equipment, the inspector and the manufacturer shall each receive one copy (the copy shall be sent without delay). The retention period for inspection records is 6 years.