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## Operating Instructions



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The **greatest possible safety** was top of the priority list when designing the Swing Arcus.

But not only passive safety - meaning the recovery behaviour once an incident such as a collapse has occurred - is important. We put as much emphasis on active safety, which means to reduce the possibility to enter situations such as negative spins.

Still, even with a DHV 1 glider you can only fly in suitable weather conditions. **The great safety margin which the Arcus gives you, is not a licence for wreckless flying!** But if you as the pilot in command stick to the rules, not many other gliders will allow you to have as much fun with the safety margin your Arcus provides.

The easy launch characteristics and the great stability in flight guarantee many enjoyable flights. Very good thermal and climbing performance in combination with the high speed range and the good glide also offer great cross country potential.

We provide a very detailed handbook. It should help you to become familiar with your glider. The description of extreme manoeuvres help to learn about the characteristics of the Arcus. But we recommend, to only test the limits of your Arcus very carefully and at high altitudes.

**Obviously, extreme manoeuvres must only be exercised over water with the necessary equipment (qualified Instruction, life vest, boat ..).**

**We highly recommend safety courses (SIV courses) even to pilots of a DHV 1 or 1-2 gliders.**

## SWING-TEAM





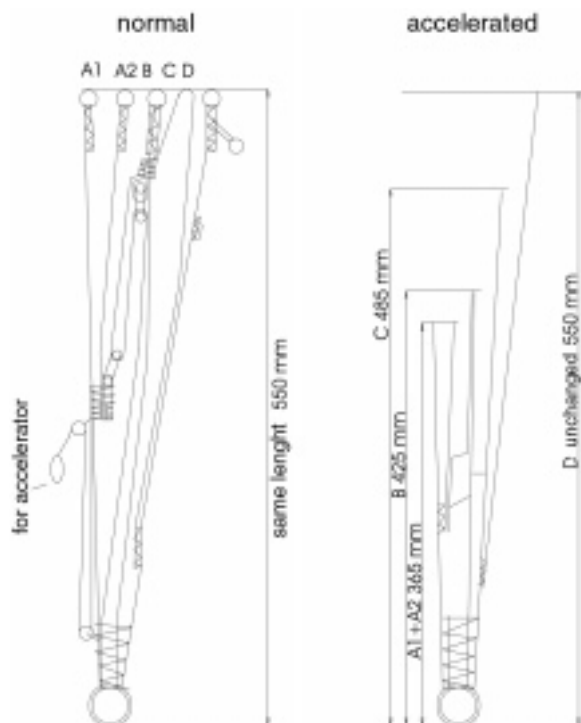
The "SWING-Arcus" is a paraglider and must not be used as a parachute. The use of the equipment is at your own risk. The manufacturer accepts no liability for damage caused by or to the glider.

### **Speedsystem**

The "SWING-Arcus" is equipped with a foot-operated speed bar that is attached to the risers. This system ensures the best possible efficiency and speed variations. Once you have attached the speed system you increase your speed by pushing it outwards with your feet. In the chapter on "Flying" we will discuss this in more detail.

### **Risers**

The **Swing Arcus** is equipped with split A-risers. These enable you to do "Big Ears" by simply pulling the outside / second A-risers without having to search for the correct a-Lines

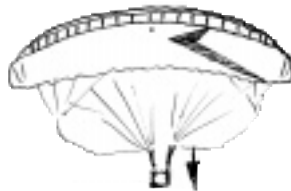


## **Pre - flight Checks**

Apart from the usual checks, the following items should be examined periodically. Start at any point and work around the whole canopy checking its sewing, lines, knots and fabric.

- Has any damage occurred due to ultraviolet exposure ?  
Though the fabric has been UV treated, it is not UV resistant.
- Does the glider show signs of tearing/ripping or other damage?
- Check each line individually. Is it in proper working order? Are the knots in the correct position? The lines should not be tangled or show signs of wear and tear.
- Check the brake lines are in proper working order, correctly adjusted, clear of knots and tangles, and securely connected to the handle.
- Are all triangle locks properly screwed shut?
- Are the canopy and the risers dry? Never fly with a wet canopy as this makes the take-off more difficult and changes the flight characteristics of the glider.
- Check the seat and harness: Ensure the leg straps are tight and of equal length, and that the chest straps are tight and in the correct position.
- Check the brake handles, risers and seams for faults.

## **Start**



### **Arranging the glider**

We recommend arranging the glider in a half moon shape into launch direction. Pull the suspension lines taut and sort out the lines beginning with the rear risers.

**Always check your lines personally, even after a launch assistant already prepared the glider for you!**

### **Launch**

The **Swing Arcus** only overshoots ever so slightly, and therefore you only need to apply very little brake during take-off. If you fly the **Arcus** version with split A-risers, note that you should be holding **both (!) A-risers** during inflation.

Inflate the glider with commitment and in a controlled manner. In normal conditions the **Arcus** does not sit back during any stage of the inflation and consequently is very easy to launch.

On a very steep launch site and/or in head wind, the **Arcus** should be braked progressively.

In strong head wind you may find it easier to inflate the **Arcus** using only the centre A-risers. This inflates the glider strictly from the centre of the canopy and it will come up slower. This is easier to control as you have more time for correction.

## **Flight**

Your "SWING - Arcus" has excellent flying characteristics, yet we recommend that you get to know your glider thoroughly. In this handbook we have divided the flying instructions into three chapters:

- 1. flying characteristics**
- 2. rapid descent techniques**
- 3. extreme flying manoeuvres**

The last chapter deals with the special characteristics of your "SWING-Arcus" during extreme manoeuvres, but their execution demands some degree of experience. We strongly discourage acrobatic or 'display' flying and recommend that all pilots participate in safety training. Your dealer will be able to provide further information on safety courses.



### **1. Flying Characteristics**

#### **Zero Position**

The "SWING-Arcus" comes either with or without the foot-operated speed bar. The canopy has been trimmed in such a way that it is always in the zero position unless you have adjusted it. Zero position is used as a starting point in describing all other positions.

#### **Best Glide**

The best glide angle in still air is achieved at trim speed **without any brake or speedbar** applied.

#### **Minimal descent**

This can be achieved with 20 -30 % brake. The more brake you apply, the slower the glider becomes and the faster you descend. This is very useful when preparing to land. If you want to do a 'shallow' or 'flat' turn in thermals, brake the "SWING-Arcus" on both sides and alter your course within the thermal circle by using your outside brake.

#### **"S" Turns**

To enter into thermals or in order to achieve steeper bank angles, only brake the glider on one side. The "SWING-Arcus" has minimal negative tendencies, however, be sensitive to the gliders reaction when doing these turns.



## **Flying in Turbulence**

You should apply slight brake pressure, around 20 %. Try to keep the canopy above yourself by actively adjusting the brakes. This requires some practise, but is essential for safe flying in turbulence. It also prevents wing collapses. Nevertheless, should this happen, it is important to maintain your direction and if necessary steer away from the hillside. You must not attempt to inflate the canopy by "pumping" the brake until the glider is stable and you are flying straight and on the correct course.

**Release the brakes when entering strong thermal lift in order to keep up sufficient air speed, avoiding a dynamic stall. Respectively brake the canopy when exiting a thermal to avoid a surge and a possible front deflation.**

## **Accelerated Flight**

According to the speed to fly principle, flying into head wind, the speed bar shall be pushed progressively in order to increase the glide angle. Whilst applying the accelerator, the **Arcus** obviously becomes more vulnerable to turbulence. Hence the speed bar should not be used below a certain safe altitude. Calculating your flight plan carefully, you should not need to use your accelerator close to the ground!

Flying accelerated requires some practice. Especially in turbulent air you should be flying as actively with your feet on the speed bar as with your hands on the controls. E.g. when flying from lift into sink, make sure to get off the speedbar to avoid collapses.

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**Note: With fully extended speed bar, the canopy becomes more sensitive. In strong turbulences we recommend to use the speed bar only in areas of strong sink.** Should you encounter a deflation, release the speed bar immediately. Counter steer and pump as explained in "Flying in Turbulence".

Release the brakes when entering strong thermal lift in order to keep up sufficient air speed, avoiding a dynamic stall. Respectively brake the canopy when exiting a thermal to avoid a surge and a possible front deflation.

## **Parachutal Stall**

**A stable parachutal stall has not been achieved in test flights. However, should your glider engage into a continuous descent, give the A risers a short downwards pull until the canopy resumes its forward flight.**





## **2. Rapid Descent Techniques**

### **Big Ears**

Big ears are a useful decent technique. While maintaining almost the same air speed, your sink rate increases to about 4 m/s. Flying the **Arcus** version with split A-risers, deflate the wing tips using the outside A-risers. This decent technique is especially suitable when ridge soaring in order to avoid being blown back into the lee side or to get away from a cloud. To recover to normal flight, just release the A-risers. In case the glider does not re-inflate immediately, you may assist by pumping the brakes carefully.

While flying with big ears, you may also push the speed bar at the same time. This results in an increase in both air speed and sink rate. Whilst achieving an average sink rate of 5m/s and 45 km/h this decent techniques lends itself to fly to the periphery of sucking clouds and even more so to avoid being blown back into the lee if the wind picks up unexpectedly whilst ridge soaring. As a positive side effect, the canopy becomes significantly more stable due to increased wing loading.

**Note: Flying with Big Ears increases the glider's angle of attack, the brake travel before reaching the stall point decreases, it is more likely to cause a steady state stall. Using the speed bar at the same time as flying with Big Ears counters these problems!**

**So: Always connect your speed bar and use it in combination with Big Ears.**



**Do never spiral with Big Ears!**

### **B-line Stall**

B-line Stalls are an excellent method of rapid descent (**up to 8 m/ps**). To induce a B-line Stall, grip the B-lines above the B-riser carabiners and pull both risers down evenly. Resistance will decrease as your hands reach head level. The wing will fold along the B-line links and your rate of descent will increase noticeably.

The wing may fold forward into a U shape if you pull the risers down too far. This is unsafe, and you should release the B-risers slowly and evenly to regain normal flight. Do not release the risers in a rapid or uncontrolled fashion.

If you release the risers too slowly you may enter a parachutal stall for 1-2 seconds, this condition normally corrects itself with a slight pendular movement. Press the A-risers should the parachutal stall persist. Whatever you do, do not apply the brakes when in this situation.

### **Front Stall**

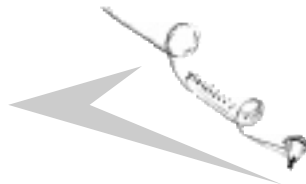
To induce a front stall, putt down both front risers (A-risers) until the entire leading edge collapses. Doing this, you can stabilise the canopy in a sink rate of about 3-5 m/s. If you pull the risers even further, the canopy will deform to a horse shoe shape. The sink rate increases to 5m/s. To re-inflate the canopy, release the risers quickly. The glider inflates above you and returns to normal airspeed without surging. Due to the low sink rate, the front stall is not a suitable decent technique.



## **Spirals**

It is possible to achieve a rate of descent of up to 10 m/s in a spiral. To induce a spiral pull down one brake evenly. An increase in pitch should be associated with this application otherwise one runs the risk of inducing a negative spin. It is always best to utilise weight shift to the inside of the spiral to support the initiation of this manoeuvre. Should velocity decrease, re-initiate the manoeuvre, do not just apply more brake pressure!

## **3. Extreme Flight Manoeuvres**



The following paragraphs describe the characteristics of the **Arcus** when experiencing extreme manoeuvres in flight. They will assist you in selecting the best way to control the glider in these situations.

**Note: The Arcus hardly ever shoots out of extreme manoeuvres, so there is no need to stabilise the glider by braking hard in any of the following situations. In fact, braking might result in the Arcus returning to the same extreme status. It is more important to give the canopy sufficient time to open up, and only use the slightest brake action to assist the re-inflation of the canopy. In all these situations remember that less braking is far better than too much braking. The SWING-Arcus very quickly returns to its normal flying position.**

### **Full Stall**

To achieve a full stall, we recommend to wrap the brakes lines around your hands once (providing the brakes lines are not shortened). Slowly pull the brake lines down until the air speed decreases noticeably. Continuing to push the brakes down, the canopy will stall and drop back. It's very important, not to release the brakes at this point! The canopy now collapses and then stabilises above your head, with the wing tips bending forwards. In this situation the pressure on the brakes is very high!

There are two recommended ways to recover from a full stall:

**1. Once the glider is stabilised above your head and settled down, release the brakes symmetrical and in one go, releasing the entire brake travel within 1-2 seconds. The brakes need to be fully released (make sure to release wrapped lines!). The Arcus will then dive slightly forward and recover to normal flight.**

**2. Let the brakes up very slowly until the entire wingspan of the canopy is just inflating. Now the glider may be surging slightly. Release the brakes very quickly on the front amplitude of this surge and the Arcus will regain normal flight position almost immediately. This recovery procedure requires some practice as the process is more complicated. If you attend an SIV course, you may practice both techniques and choose the one you prefer.**



## **Negative Turns (Flat Spins)**

They occur:

- \* Whilst braking hard when one brake is either applied more or released faster than the other.
- \* Fast braking of over 70 % on only one side when flying at normal speed.
- \* Flat spins usually occur during thermal flying, uneven application of brakes when landing, initiating a new flying position too hastily, or when one brake is pulled beyond the critical point of 70 - 100 %.

Negative turns are indicated by the softening of the braked side of the canopy, which then recedes backwards inducing a backward spin. **Should you encounter this situation, RELEASE THE BRAKES!** The canopy will automatically stabilise itself. Possible collapse of one wing can be countered as described in "flying in turbulence".

## **Asymmetric Collapse**

Asymmetric collapses usually occur when flying in strong lift or turbulence.

The air empties out of one side of the wing and it collapses. The vents will then turn towards the collapsed side. If not stabilised, the **Arcus** will re-inflate after turning 90-180 degrees. Braking on the opposite side will prevent the glider from turning. Do not apply too much brake. It is only necessary to prevent the glider from turning. The wing should re-inflate without input, however, you can assist by pumping the deflated side. Remember to keep applying the brake on the opposite side until the wing is stable and flying in the correct direction.

## **Front Tuck**

Front Tucks may occur when flying in very turbulent air. Flying the glider actively - by countering canopy movement through light brake input - will prevent front tucks in most cases. A front tuck will recover independently. By applying some brake on either side you may assist and accelerate the recovery.

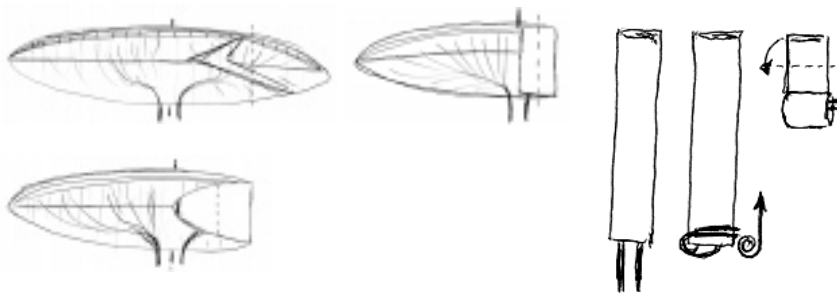


## **Landing**

To reduce the forward speed and glide of the canopy when setting up for landing, brake at about 50 %. You achieve a soft landing if you brake continually shortly before touching down.

## **Folding away**

We recommend that you sort the lines and loosely throw them on top of the canopy before folding it up. Folding the canopy from both ends towards the middle has proven to be the most effective and efficient method. You end up with a strip approx. 60 cm wide. Roll this up from the trailing edge to the leading edge and hold it together with the strap provided. The enclosed stuff bag offers additional protection against any damage.



## **Transport**

The paragliding equipment is best transported in its own rucksack or carrying case, as **sunlight and too much heat can affect the equipment adversely**. If transporting your glider by car, please remember that the exhaust can substantially heat up some parts of the boot, which can be damaging to both fabric and lines. For the same reason it is recommended that you do not leave your unprotected equipment under windows where it may be affected by direct sunlight.

## **Storage**

All the equipment should be stored away from light in a dry, well ventilated room, and protected from temperature fluctuations. Rooms where petrol, solvents, or other chemically aggressive substances are stored are unsuitable. If you will not be flying your Arcus for more than a few weeks, we recommend that you open the rucksack and slightly unroll the glider to release the tension. This will circulate air around it and allow it to breath.

Should the canopy become wet, spread it out so that the air can dry all areas. This is best achieved by laying out the entire canopy. **Even if the fabric feels dry, it may not be.** The fibres retain moisture and the water takes longer to diffuse out of the fibres than it takes to evaporate on the surface. Thus your canopy may feel dry in the evening, but may be wet again the following morning. It can take several days for the canopy to dry out completely. This is an essential process and if it is ignored, the material will become porous and impede the efficiency of your glider.

## **Servicing**

Your equipment needs constant checking, especially the canopy material, the seams, the lines, and last but not least, the harness and straps. As part of the guaranteed safety certificate the producer in Germany is required to check the glider every second year.

## **Checking Data**

Your glider and especially the lines may become distorted by extreme weather conditions or excessive use. Should you get the impression that your glider's performance has changed, please return it to **Swing** or your local dealer for checking.

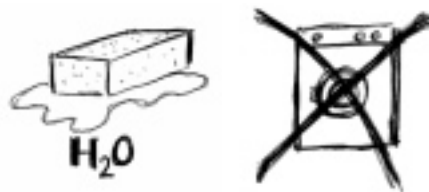
It is not necessary to change parts of your glider regularly. Should it be necessary to replace parts due to damage or wear and tear, only original parts or those authorised by the producer, may be used.

## **Repairs**

Repairs to the glider should only be undertaken by the manufacturers or experts recommended by them. In places of minimal stress, small tears up to 3 cm in the sail (but not the seams) may be repaired using approved materials. Do not replace lines or perform repairs using celotape, masking tape or similar products. Please remember that it is always preferable to let your local dealer carry out any repairs on your glider.

## **Cleaning**

Should your canopy ever become soiled, wipe it down with a soft sponge and clear water. If the dirt is ingrained, use warm water and soap flakes. Ensure the canopy is completely dry before storing it away. Any cleaning with aggressive chemicals, excessive force, or hot water weakens the fabric, dissolves the surface finish and renders the canopy useless. If in doubt, put up with a few blemishes on your canopy and rather ensure that you have a safe and secure glider.



## **Suitable Harnesses**

The **Swing Arcus** may only be flown with harnesses fitting the DHV category "GH". Nearly all recent products are "GH" harnesses, since cross over harnesses did not prove favourable in combination with modern gliders. Should you still own an old type harness, you may need to check its category by contacting DHV. "GH" = chest strap = suitable for the **Arcus**.

GX = Cross Over Harness = not suitable for the **Arcus**.



## **Artistic Display Flying**

Acrobatic or 'display' flying is not recommended when flying the SWING-Arcus.

## **Motorised Flying**

The SWING-Arcus was not designed for use with engines. The use of any kind of engine in conjunction with this glider is, therefore, not approved.

## **Winch Starts**

Winch-assisted take offs are permitted as long as the usual rules are obeyed, i.e.

- \* The pilot must be in possession of the correct licence;
- \* The winch must be suitable for paragliders;
- \* The winch operator must be in possession of the correct licence, if applicable.

**When taking off with a winch, manoeuvre the canopy with gentle actions and do not over brake!**



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*And now have a nice time!!!*

