



OWNER'S  
MANUAL  
MIRAGE 2<sup>RS</sup>





Dear MIRAGE 2 RS owner

THANK YOU FOR PURCHASING A SPEEDWING FROM SWING!

This operating manual is an important part of your glider. In it you will find instructions, important information on safety, care and maintenance, as well as tips on flying techniques and information about the sport in general.

Please read this document carefully before use!

We hope that you will experience many years of flying pleasure with your MIRAGE 2 RS. Your Speedwing is characterised by innovative design, first-class materials and high-quality manufacturing.

The life of your Speedwing depends largely on how you handle the material. If you follow the care instructions and handle your MIRAGE 2 RS with care, you will enjoy it for a long time.

If you have any questions beyond the scope of these operating instructions, please contact your SWING dealer or SWING directly. You will find our contact details in the appendix.

We hope you enjoy using the MIRAGE 2 RS.

Your SWING Team

This Speedwing is equipped with SWING Ram Air Section Technology (RAST).



## INFORMATION



SWING Flugsportgeräte GmbH reserves the right to alter or add to the contents of this Manual at any time. You should therefore regularly visit our website:

**[www.SWING.de](http://www.SWING.de)**

where you will find additional information relating to your paraglider and any changes to the Manual. There is further information about the SWING website in the section “SWING on the World Wide Web”.

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## WARNING

Read manual before use!

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# 01 Introduction

## Manual

Be sure to read these operating instructions carefully before using the Mirage 2 RS for the first time. This will help you to familiarise yourself with new functions and tell you how to get the most out of the Mirage 2 RS.

Information in these operating instructions regarding the design of the Speedwing, technical data and illustrations are subject to non-binding changes. We reserve the right to make changes without prior notice.

The marking of special texts is based on ANSI Z535.6.

The operating instructions consist of a total of three parts which include the following:

1. operating instructions (present):  
Instructions for the commissioning and operation of the Speedwing.
2. service and inspection booklet (PDF/download):

Technical data as well as unit-specific information for inspection

### Special text



#### DANGER

Sections of text headed “Danger” indicate a situation where there is **imminent** danger, which in all probability **will lead to death or serious injury**, if the instructions given are not followed.



#### WARNING

Sections of text headed “Warning” indicate a potentially dangerous situation, which **may lead to death or serious injury**, if the instructions are not followed.



#### CAUTION

Sections of text headed “Caution” indicate a potentially dangerous situation, which may lead to **minor or slight injury**, if the instructions are not followed.



#### PLEASE NOTE

Sections of text headed “Please note” indicate possible **damage to property**, which may occur if the instructions are not followed.



#### TIP

Sections of text headed “Tip” give advice or tips which will make it easier to use your paraglider.

## Series of instructions

In this Manual, instructions which must be followed in a certain order are numbered consecutively.

< Where there is a series of pictures with step-by-step instructions, each step has the same number as the corresponding picture.

d Letters are used where there is a series of pictures but the order is not relevant.

## Lists of parts

Numbers circled in red (❶) refer to various parts of the item pictured. A list of the numbers and the name of the part labelled follows the picture.

## Bullet points

Bullet points are used in the Manual for lists.

Example:

- risers
- lines

## Paraglider manual on the internet



Additional information about your paraglider and any updates to the Manual can be found on our website

at [www.SWING.de](http://www.SWING.de).

This Manual was current at the time of going to print. This Manual can be downloaded from SWING's website prior to print.

## SWING Flugsportgeräte and the environment

Protection of the environment, safety and quality are the three core values of SWING Flugsportgeräte GmbH and they have implications for everything we do. We also believe that our

customers share our environmental awareness.

## Respect for nature and the environment

You can easily play a part in protecting the environment by practising our sport in such a way that there is no damage to nature and the areas in which we fly. Keep to marked trails, take your rubbish away with you, refrain from making unnecessary noise and respect the sensitive biological equilibrium of nature. Consideration for nature is required even at the launch site!

Smokers – please do not leave any cigarette butts, matches etc. at flying sites.

Paragliding is, of course, an outdoor sport – protect and preserve our planet's resources.

## Environmentally friendly recycling

SWING gives consideration to the entire life cycle of its paragliders, the final stage of which is recycling in an environmentally friendly manner. The synthetic materials used in a paraglider must be disposed of properly. If you are not able to arrange appropriate disposal, SWING will be happy to recycle the paraglider for you. Send the glider with a short note to this effect to the address given in the Appendix.

## 02 Basic rules for use

### Safety instructions

- Before using the glider for the first time, the operating instructions must be read carefully and handed over to the third party if the glider is passed on or sold.
- Only acceleration on the ground with the canopy fully open until take-off is permitted as a launch (no cliff, D-bag or similar launches).
- The MIRAGE 2 RS may only be used for speedflying and speedriding. Never use it as a jump or personal parachute.
- Extreme caution must be exercised when using the device.
- This product may only be operated by persons who are in good physical condition and have the appropriate experience and skill in the sport of flying.
- Use at your own risk. The manufacturer is not liable for any personal injury or material damage arising in connection with the use of the MIRAGE 2 RS. Any danger to third parties must be excluded.
- Do not modify the construction of the MIRAGE 2 RS under any circumstances, as this will invalidate any warranty claim and any operating permit.
- First familiarise yourself with your MIRAGE 2 RS on the practice slope.
- The legislation in force in the respective countries concerning the use of this device must be followed.
- We recommend that you undertake training (if you do not already hold a paragliding or parachuting licence)

and then be instructed in speedflying and speedriding.

- The MIRAGE 2 RS must not be used for aerobatics. The glider has not been developed and tested for aerobatics. Aerobatics include all flight conditions with an inclination of more than 135 degrees around the lateral or longitudinal axis as well as all flight conditions with stall.
- After 100 hours or 24 months (whichever comes first) the MIRAGE 2 RS must be inspected in accordance with the inspection instructions. If damaged or used parts need to be replaced, use only original parts from SWING Flugsportgeräte GmbH.



### WARNING

Have your Mirage 2 RS checked regularly.

Altered flight behaviour due to trim changes can lead to accidents and serious injuries!

Observe the other specific safety advice in the various sections of this Manual.

## Personal responsibility

Before using your MIRAGE 2 RS for the first time, you agree that you have read and understood the entire MIRAGE 2 RS Owner's Manual, including all instructions and warnings contained herein.

In addition, you agree to ensure that any other user (who takes over the product from you permanently or temporarily) has also read and understood the entire instruction manual, including all instructions and warnings, before using your MIRAGE 2 RS.

## Risk Prevention

Use of the MIRAGE 2 RS and its components involves certain risks of bodily injury or death to the user of this product or to others.

By using the MIRAGE 2 RS, you agree to assume and accept all known and unknown, probable and improbable risks of injury.

The dangers associated with the practice of this sport can be reduced by careful attention to the warnings listed in this instruction manual.

## Ten safety rules

The greatest risk in speedflying and speedriding is simplicity. It tempts you to forget or ignore the dangers. Be careful when the feeling of normality arises.

### 1. Check the objective dangers!

**Weather:** Never fly in a foehn, thunderstorm or cold front! Even though your MIRAGE 2 RS offers maximum safety, the dangers of extreme turbulence cannot be calculated.

**Avalanches:** Only move in unsecured terrain with the necessary training and equipment (avalanche transceiver, shovel, etc.).

### 2. Check your equipment!

Take a close look at your equipment before every launch and only launch with undamaged material! Adapt your equipment to the conditions: We recommend carrying an emergency parachute in case of a larger slope distance.

### 3. Check yourself!

Never fly if you feel unwell, whether you are physically unfit or worried. The mountains don't run away - give yourself a rest day.

### 4. What if...? Make a "Plan B"!

Don't make impulsive decisions. Take your time to analyse the situation. Always have a plan B (e.g. choice of route, emergency landing sites, etc.).

### 5. Always make a "safetyrun"!

Explore a new route by flying with sufficient altitude. While doing so, keep an eye out for possible obstacles. Make sure that flying close to the terrain does not endanger third parties either.

### 6. Foot launch = increased risk!

Remember: Foot launching with the MIRAGE 2 RS (= speedflying) increases the risk potential many times over!

### 7. Have the courage to criticise!

Express criticism if you have the feeling that people overestimate themselves. In return: Be open to criticism, even if it is unpleasant to admit mistakes.

### 8. Analyse your mistakes!

Analyse every near-accident as if it had been a real accident and draw the necessary lessons from it. Avoid repeating the dangerous situation.

## 9. NO FRONTRISER TURNS!

Never pull down the frontrisers (A-risers)! Your SWING MIRAGE 2 RS could react immediately with a collapse!

## 10. No risk - no fun; no limit - no life.

Respect your limits and don't exceed them just because you are out with experienced colleagues. Have the courage to do without!



### WARNING

**SPEEDRIDING AND SPEEDFLYING IS DANGEROUS!**

Only with careful risk management can this sport be practiced with an acceptable residual risk.

## Liability and warranty exclusions, operating limits

Use the Mirage 2 RS at your own risk!

The manufacturer cannot be held liable for any personal injury or material damage that occurs in connection with SWING Speedwings. Any modification (construction, but also brake lines beyond the permissible tolerances) or improper repair to this Speedwing as well as missed inspections (annual and 2-year check) will result in the expiry of the operating licence and warranty.

Each pilot is responsible for his own safety and must ensure that the Speedwing is checked for airworthiness before each launch. A launch may only take place if the Speedwing is airworthy. Furthermore, the pilot must comply with the respective national regulations outside Germany.

### Intended use

The MIRAGE 2 RS has been developed for speedflying and speedriding.

The MIRAGE 2 RS may only be used for speedflying and speedriding.

The only take-off permitted is acceleration on the ground with the canopy fully open until take-off (no cliff, D-bag or similar take-offs).

### Operating limits

The MIRAGE 2 RS may only be operated within the operating limits.

These are exceeded if one or more of the following apply:

- use outside the permissible weight range
- use with wet or icy canopy or lines or in conditions that may cause this to happen
- temperatures below  $-20^{\circ}\text{C}$  and above  $50^{\circ}\text{C}$
- turbulent weather conditions and wind speeds at the launch site that are higher than  $2/3$  of the maximum flyable speed (depending on the launch weight) of the glider
- aerobatics / extreme flight or flight maneuvers with inclinations of more than  $135$  degrees
- maneuvers with loads below  $0g$  and above  $4g$
- spiral dive
- unauthorized modifications to canopy, lines or risers



### WARNING

The operating limits must be observed throughout the entire flight.

## Exclusion of liability and waiver of claims

The company SWING Flugsportgeräte GmbH expressly points out that no liability whatsoever is accepted by the company SWING in the event of use!

By using the MIRAGE 2 RS you agree to the following:

- Waiver of all claims whatsoever arising from the use of the MIRAGE 2 RS and its components which you wish to assert now or in the future against SWING Flugsportgeräte GmbH and all other contractual partners.
- Release SWING Flugsportgeräte GmbH and all other contractual partners from any claims for liability, loss, damage, injury or expenses which may affect you, your next of kin and relatives or other users of your MIRAGE 2 RS, insofar as these result from the use or from the manufacture and processing of the MIRAGE 2 RS and its components.

Upon death or disability, all of the terms and conditions set forth herein shall become effective and binding upon your heirs, next of kin, executors, administrators, successors and legal representatives.

SWING Flugsportgeräte GmbH and all other contractual partners have not made any other oral or written representations and expressly deny that this has been done, with the exception of what is stated in the MIRAGE 2 RS operating manual.

## 03 Technical description

### Manufacture of the MIRAGE 2 RS

The MIRAGE 2 RS is manufactured by SWING using the most modern machines and processing techniques. A precise quality control is carried out after each processing step. This quality control naturally also includes the incoming inspection of the materials used. In this way we try to exclude material defects and can trace the exact origin of all materials used.

#### Technologies

The following technologies were used in the MIRAGE 2 RS by our development team:

- revised canopy profile
- RAST technology
- aerodynamically optimised profile nose incl. Nitinol Wires
- high cell density for a dimensionally stable profile with higher performance
- long, progressive brake travel
- light material mix
- Split-A Riser
- C-Bridge
- 12 mm webbing width
- optimized trimmers
- dirt outlets at the trailing edge
- completely new color design

### RAST



The MIRAGE 2 RS features Swing's unique Ram Air Section Technology, known as 'RAST' for short.

This system divides the interior of the paraglider into several chambers crossways to the flight direction.

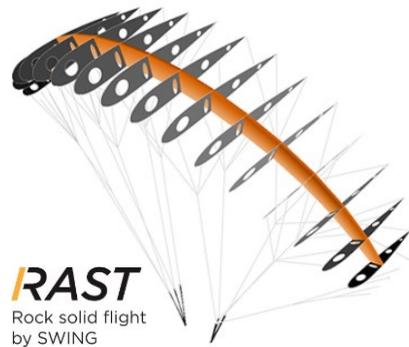


Fig. 1. **Sketch RAST**

Through defined openings, the air flowing in or out is regulated in such a way that it can influence the filling behaviour (during the starting process) and also the emptying of the Speedwing canopy (in the event of canopy malfunctions).

#### Inflation behaviour

When the Speedwing is inflated, RAST delays the inflowing air. This means that the flow-relevant front part of the profile is formed much faster and the glider immediately starts to rise away from the ground. During the further inflation process, the rear part of the canopy is only slowly filled with air, resulting in a very harmonious and even launch behaviour without any tendency to overshoot or lever out.

### Flight behavior

RAST shows its full strength in turbulent air: RAST effectively stabilises the canopy and smoothly balances turbulent air.

Through more direct and precise handling, it offers more control in turbulent conditions.

This makes the MIRAGE 2 RS extremely stable and forgiving, which means significantly more precision and effective performance for the pilot.



### TIP

Do not be tempted by the increased safety offered by RAST into taking greater risks. Instead, you should use RAST as your personal crumple zone if there is ever a situation where you have misjudged conditions.

### Type testing

The Mirage 2 RS has been extensively and successfully tested by SWING for its suitability for the intended use.

In addition, the strength according to DIN EN 926-1:2016 was verified by an accredited licensing body.

Please refer to the technical data for the total masses permissible for operation.

The MIRAGE 2 RS does not comply with the German LTF NFL HG GS 2-565-20 for hang gliders and paragliders.

## Technical data

| MIRAGE 2 RS                           | 8,5    | 9,5    | 11     | 13     | 15     |
|---------------------------------------|--------|--------|--------|--------|--------|
| Number of cells                       | 27     | 27     | 27     | 27     | 27     |
| Glider weight [kg]                    | 1,7    | 1,8    | 2,0    | 2,2    | 2,4    |
| Wing area [m <sup>2</sup> ]           | 7,8    | 8,8    | 10,5   | 12,5   | 15     |
| Wing area projected [m <sup>2</sup> ] | 6,8    | 7,6    | 9,0    | 11,0   | 13,0   |
| Wing span [m]                         | 5,4    | 5,8    | 6,3    | 6,9    | 7,6    |
| Wing span projected [m]               | 4,5    | 4,8    | 5,2    | 5,7    | 6,3    |
| Aspect ratio                          | 3,8    | 3,8    | 3,8    | 3,8    | 3,8    |
| Aspect ratio projected                | 2,8    | 2,8    | 2,8    | 2,8    | 2,8    |
| Maximum allowed take off weight [kg]  | 50-119 | 50-119 | 50-119 | 60-119 | 60-119 |

Further technical data and material information can be found in the service and inspection booklet.

## 04 Setting up the MIRAGE 2 RS and first-flying

### Before the first flight

During production, the MIRAGE 2 RS goes through several quality control checks before finally undergoing an exact type certification test. Conformity with the reference specimen is checked and certified before the glider is delivered to the customer. Extreme care is taken in the manufacture of all patterns, lines and riser lengths. They show a high level of precision and should not be altered under any circumstances.



### WARNING

Any changes or improper repairs to this Speedwing render invalid the certification and warranty.

### Adjusting the main brake lines

The MIRAGE 2 RS is delivered ex-factory with a brake adjustment complying with that of the test sample. This position is marked on the steering line.

This adjustment will allow you to steer and land the paraglider with almost no time lag.

The main brake lines must be checked by an expert before the test flight and must be fastened so that the mark is visible approx. 5mm above the knot.

The length of the break line must not be altered.

Looping of the brake handles.



Fig. 2. Recommended variant; hand guided through brake loop



Fig. 3. Back view of Fig. 2



**WARNING**

If the brake lines are too short, the following risks could arise:

- there could be an early stall
- the Speedwing does not launch well and there is a risk of deep stall
- the paraglider exhibits dangerous behaviour in extreme flying

Environmental conditions can also lead to the brake lines shortening.

You should therefore check brake line length regularly, particularly if there is any change in launch or flight behaviour.

If the brakes are shortened, care must be taken that the Speedwing is not slowed down in trim and accelerated flight because of the brake lines being too short. Safety issues may arise and performance and launch behaviour may deteriorate if the brake lines are shortened too much.

Brake knots

The overhand knot shown below is the most suitable for connecting the brake line to the brake handle.



**WARNING**

Loose, unsuitable or incorrectly tied brake line knots can cause the main brake line to loosen and then lead to loss of control of the glider.

Ensure that only overhand knots are used and that they are tied correctly.

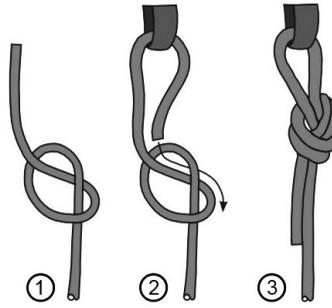


Fig. 4. **Overhand-knot**

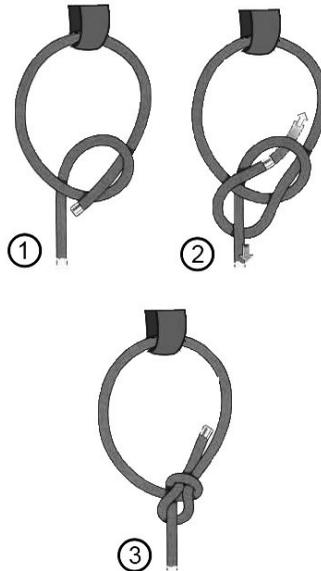


Fig. 5. **Palstek-knot**

In the area of the brake line / brake handle connection there is a swivel which prevents the main brake line from twisting in a helical manner.

**Rescue parachute**

For emergency situations with permanent failure of the Speedwing, for example after a collision with another aircraft, it is recommended to carry a certified rescue parachute.

When selecting a rescue parachute, ensure that the intended take-off weight is adhered to. The rescue parachute must be attached according to the manufacturer's instructions.

## Suitable harnesses

Caution: Never use the MIRAGE 2 RS with a harness with a seatboard or even a recumbent harness!

The MIRAGE 2 RS can become extremely difficult to uncontrollable when combined with this type of harness!

If you have any questions or doubts about using your harness with the MIRAGE 2 RS, please contact your SWING dealer or SWING directly.

## Tragegurte & Trimmer



### WARNING

#### NO FRONTRISER TURNS!

The 3-liner construction does not allow front riser turns! Pulling on the front risers inevitably leads to a clatter, which can have fatal consequences!

The MIRAGE 2 RS has brake handles (toggles) for steering.

The riser of your MIRAGE 2 RS is designed so that you can operate everything with gloves on. The MIRAGE 2 RS riser has an anti-rotation device on the B-plane. In addition, the B-plane is deflected again to change the profile and angle of attack more effectively when the trimmers are opened. This counteracts any vibration of the canopy. The SWING Speedflying Team advises every pilot who wishes to fly his MIRAGE 2 RS over the backrisers to do so between the B- and C-risers on the marked C-bridge.

The trimmer travel itself has a strong effect on the "Dive & Speed" of your MIRAGE 2 RS.

Therefore, keep the trimmer closed for your first flights and slowly familiarise yourself with it.

The trimmer allows you to fly with the best glide when closed. Open your trimmer to take advantage of the "dive" or to lose altitude. To adjust the trimmers in flight, keep the brake handles in your hands and operate the trimmers symmetrically. If you adjust the trimmers asymmetrically (e.g. if you open one at a time) your MIRAGE 2 RS will fly an aggressive turn to the side of the closed trimmer. The rubber band also prevents the trimmer ribbon from fluttering when the trimmers are closed, as it fixes it in place.



Fig. 6. **Trimmer**

However, also bear in mind that when opening the trimmers step by step, they can suddenly snap open completely without you wanting them to. Afterwards, simply pull the trimmers back to the desired position. Approach fully opening the trimmers step by step. The "speed & dive" increases greatly with the trimmers open. After you have become familiar with the MIRAGE 2 RS with the trimmers closed, be sure to approach full trimmer travel slowly and gradually, as the "Dive" glide angle decreases

sharply. Keep in mind that the turn sink increases greatly when the trimmers are opened!

### Trimmer positions

- Best glide: Trimmers fully closed and brakes applied at approx. 15% (let arms hang down).
- Highest collapse stability in turbulent air: trimmers completely closed and "actively flying" with the brake handles
- Maximum speed in steepest flight: trimmers completely open, 0% brake
- Minimum sink: approx. 50% brake
- Minimum sink in turns: trimmer fully closed
- Maximum height loss in curves: trimmer fully open

### Facts about the trimmer settings

- The trimmers not only change the sink rate, but also the response of your MIRAGE 2 RS to weight shift. Your MIRAGE 2 RS responds best to weight shift with the trimmers closed. It reacts least with the trimmers fully open.
- The more you open the trimmers, the longer the braking distances will be. The position of the brake handles in the zero position is then further up.
- The trimmers affect the length of the braking distances, but not their minimum airspeed. This means that your touchdown speed does not depend on the trim position.
- Your MIRAGE 2 RS will become more "pitchy" the more you open the trimmers, which means, for example, that it can shoot forward more during take-off.

- Avoid flying for long periods with the trimmers fully open and the brakes applied sharply. You may feel a slight vibration on the brake.



### WARNING

Never fly with the trimmers completely open in turbulence!

### Basic rule:

Closed trimmers:

Normal flight



Fig. 7. **Trimmers closed**

Open trimmers:

more "Speed & Dive"

(Dive with open brakes)

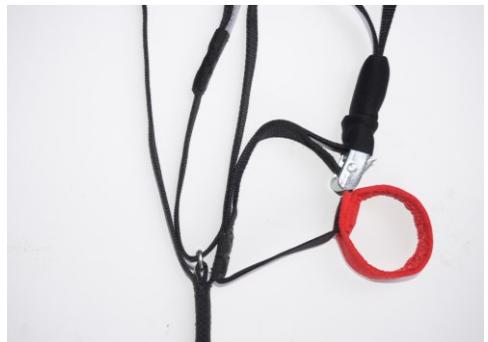


Fig. 8. **Trimmer opened**

## Replacing the trimmer webbing

Frequent operation of the trimmers during flight causes the trimmer webbing to wear out. It can then happen that the trimmers open unintentionally in flight (possibly only on one side). If this happens frequently, the trimmer webbing must be replaced. Please contact your dealer or SWING directly.

and pull the speedbag closed, hook the speedbag to the harness

When stowing the MIRAGE 2 RS, always make sure that all lines and straps are inside the speedbag and that nothing is hanging out with which you could get caught.

After the last run of the day, you can also fix the risers to the speedbag's webbing by pulling the webbing through the riser loops.

## Your Speedbag



Fig. 9. **Speedbag-bags on your SWING Speed Harness**

The speedbag makes it much easier for you to use the MIRAGE 2 RS and is **MANDATORY** in most speedriding sites!

For take-off: take the glider out of the speedbag, roll up the speedbag and pack it into the side pocket of your harness.

After riding: Gather the MIRAGE 2 RS, take out the speedbag and lay it open next to the glider. Place the gathered paraglider on the unfolded speedbag, stow the paraglider in the speedbag

## 05 Use

The 10 safety rules listed above should be second nature!

### Behaviour in the skiing and flying area

First of all, some important rules that you should observe in the skiing and flying area:

- First clarify the local conditions, e.g. with the lift operator. Is speedflying or speedriding permitted or prohibited, which rules should be observed?
- When speedriding, always keep off-piste, and when speedflying, adhere to the local regulations regarding minimum distances.
- If there are designated speedriding zones, stick to them
- Pack your MIRAGE 2 RS in the speedbag before you go back on the ski slope.
- Make sure that you do not get caught anywhere with your harness or speedbag so as not to disrupt lift operations!
- Any danger to third parties, especially skiers, must generally be ruled out.

Please keep in mind that more speed riders and speed flyers want to have fun in the area.

### Launch preparations

#### First flight

Before your first launch, familiarize yourself with the SWING MIRAGE 2 RS by doing wind-up exercises and practicing a few runs, take-off, flight behavior and landing on a practice slope.

Your first runs should take place in a terrain you know well and are comfortable with, and should start with a Safetyrun.



### WARNING

Do not overestimate yourself. Do not let your own or other pilots' overconfidence lead you into reckless behaviour.

#### Pre-flight check

Check your material carefully before each run:

- No tears or other damage to the sail
- No knots or overthrows in the lines
- Brake lines free to move and firmly connected to the handle
- Correct adjustment of the brake line length
- Check the screw shackles on the lines and on the risers (tightly closed and secured).
- No damage to risers and seams
- Trimmer strap undamaged and trimmer buckles not slipping through
- No damage to the harness
- Rescue handle properly secured, if present

#### Launch check

Check the most important safety-relevant points immediately before take-off, preferably always in the same order so as not to forget anything:

1. personal equipment (harness, carabiners, reserve parachute and helmet) properly put on, all loops closed and all buckles securely locked?
2. parachute properly laid out and risers free and untwisted?

3. do the terrain and weather, especially wind direction and strength, allow a safe run?
4. airspace and launch area clear?

## Launch

Before every start, make sure that the trimmers are set the way you want them. Due to the extremely high effectiveness of the trimmers, a misadjustment at take-off can have fatal consequences.

With the MIRAGE 2 RS it is not necessary to take the A-risers in your hand when launching with skis. On the contrary, if you hold the A-risers at take-off, the MIRAGE 2 RS may surge forward.



Fig. 10. **Braking during start**

It is best to take off with the brakes in your hands only, about 30% applied. As soon as the MIRAGE 2 RS is above you, apply the brakes strongly and briefly to prevent it from shooting forward. At the same time, you can take the indispensable control look.



Fig. 11. **Braking during control look**

Your MIRAGE 2 RS has relatively short lines. This allows it to build up a lot of energy during take-off and overtake the pilot or break away more to the side.



## WARNING

At higher wind speeds (from approx. 6 m/s) the Speedwing must be actively held on the ground. Otherwise the glider may rise above the pilot on its own.

## Level flight

The symmetrical pull on the brake lines adjusts the speed and glide to the flight and terrain situation to ensure optimum performance and safety.

The best glide speed in calm air is achieved with the MIRAGE 2 RS with the brakes fully open. If the brake line is pulled about 10 cm on both sides, the glider is in the area of least sink. If you increase the tension on the brakes further, the sink rate is no longer reduced, the control forces increase noticeably and the pilot reaches the minimum speed.

## Turning flight

The MIRAGE 2 RS reacts instantaneously to control impulses and is extremely agile.

Basically the control is a combination of weight shift to the inside of the turn and brake line pull on the inside of the turn.

As the brake line pull increases, the lateral position increases and the glider flies a fast and steeper curve with a high sink rate, which turns into a steep spiral at the end.

## C-Bridge Control

The C-Bridge (grey riser), which connects the B and C planes, allows the Mirage 2 RS to be controlled precisely with the trimmers closed and open. With the trimmers open, the C-bridge allows the pilot to control the angle of attack to adapt the glide to the terrain. With the trimmers closed, the best glide can be achieved with a slight pull on the C-bridge.

Emphasising the pull on the C-risers allows the Mirage 2 RS to be controlled very efficiently and flown actively.

Caution: Never fly with the trimmers fully open in turbulent weather conditions.

## Emergency control

If the brake lines fail, e.g. due to loosening of the knot at the brake handle, or a defective brake line, the MIRAGE 2 RS can also be steered and landed with the rear risers.

In this case, the stall occurs earlier and the pilot must compensate for the changed flight behaviour by pulling sensitively on the risers.

## Landing

After landing, simply stay hooked in, take the speedbag out of the side pocket and pack the MIRAGE 2 RS gathered in it so that no more lines hang out.

The speedbag can be taken under the arm to re-enter the lift.

Here we refer again to the rules at the beginning of the chapter.



### TIP

After each landing, adjust trimmers to how you want them to be on the next take-off!

## 06 Storing and looking after

### Temperature range

Extreme temperatures can affect the air density and therefore the flight behaviour of the Speedwing. Be aware of this fact especially at very low temperatures.

Basically, operating temperatures below  $-15^{\circ}\text{C}$  should be avoided.

### Advertising and adhesive sails

Before attaching advertising, make sure that the adhesive sail to be applied does not alter the flight characteristics. In case of doubt, you should refrain from gluing in advertising.



#### PLEASE NOTE

Sticking large, heavy or unsuitable adhesive sails on the glider may invalidate the operating permit.

## Storing

### Storing and Transport

Always transport your SWING MIRAGE 2 RS in the speedbag supplied.

Make sure that you do not store your SWING MIRAGE 2 RS in a damp place. Store your speedriding equipment away from light in a dry room that is well ventilated and temperature stable. Take it out of the reversible harness backpack and open the speedbag to allow air to reach the cloth. Looking after your Speedwing

### Handle with care

The service life of your Speedwing depends largely on how you handle the material.

In order to enjoy your MIRAGE 2 RS for a long time, please follow the care instructions and handle your MIRAGE 2 RS with care.



#### PLEASE NOTE

Never drag the umbrella across the ground. Pointed and sharp objects, such as stones or branches, can damage the fabric and lines! Keep this in mind when choosing your launch site.

### Cloth

For the MIRAGE 2 RS, SWING uses a specially developed polyamide cloth with a high-quality coating for improved UV resistance, colour fastness and air impermeability. This fabric is subjected to the strictest laboratory controls and has been tested over several months under extreme conditions in hard flight operations.

Care is essential to ensure the durability and retention of value of these fabrics and your sail. Therefore, protect your sail from unnecessary UV rays. Unpack your MIRAGE 2 RS just before take-off and re-pack it immediately after landing. Even though modern speedwing fabrics are increasingly better protected from the effects of solar radiation, UV radiation in particular is still one of the decisive factors in the ageing of the cloth. First the colours fade, then the coating and fibres begin to age.

In the production of MIRAGE 2 RS, the coated side of the fabric is placed on the inside. The coating, which is crucial for the fabric's properties, is thus relatively well protected from mechanical damage. Nevertheless, when choosing a launch site you should, if possible, select a surface that

is free of sharp-edged and protruding objects.

Do not step on the glider. Such kicks weaken the fabric, especially on hard and stony ground. At the launch site, also pay attention to the behaviour of spectators, especially children: Do not hesitate to draw attention to the sensitivity of the fabric.

Please make sure that there are no insects in the canopy when packing the Speedwing. Some species produce acids during decomposition that can etch holes in the cloth. Locusts bite through the cloth with their mouthparts, creating holes. They also secrete a dark, strongly staining juice. Shoo them away before folding. Contrary to a common misconception, these insects are not particularly attracted to any particular colour.

A brand-new umbrella is often heavily compressed on delivery. This compression is only for the first transport and should not take place afterwards. Therefore, do not fold your glider too tightly after use. And even if it is very comfortable - if possible, never sit on the packing bag your glider is in.

### Lines



### PLEASE NOTE

Dyneema lines, which are used in the area of the main brake lines, for example, are very temperature-sensitive and can be permanently damaged at temperatures above 75° C. Therefore your glider should never be stored in a hot car especially during summer

The MIRAGE 2 RS is equipped with different high-quality and precisely manufactured lines, which have been selected according to the load and application areas. Similar to the cloth

material, lines also lose their strength mainly due to UV radiation. The same applies here: Protect your lines from unnecessary UV radiation.



### WARNING

Be sure to observe the prescribed maintenance intervals for the lines in the service and inspection booklet.

Improper handling and neglected maintenance intervals can cause the lines to tear.

Especially when ground training with crossed risers, make sure that the sheath of the lines is not chafed by friction.

Do not step on the lines after laying out the glider and watch out for spectators or skiers who may accidentally run over your lines.

When packing up, avoid unnecessary kinking of the lines and only use the described knots as brake knots.

### Dampness / humidity

If the glider gets wet or damp, it should be dried as soon as possible in a well-ventilated room (but out of the sun). It may take several days before the canopy has dried completely because the fibres absorb water. Mould may form if the paraglider is stored wet and the fibres may rot, particularly when it is warm. This can make the Speedwing unsuitable for flying within a short time.

Likewise, if a wet glider freezes, it can also become unsuitable for flying after a short time.

### Contact with salt water

If salt water gets on the glider, before being dried, it should immediately be thoroughly rinsed in fresh water. It

should then be dried in a well-ventilated room (but out of the sun). If the glider is not thoroughly rinsed, there may be permanent damage to the material.

### **Sand and salt air**

In many cases, sand and salt air cause the lines and fabric to age much more rapidly. If you often fly near the sea, the glider should be inspected more frequently than normally required.

### **Cleaning**



#### **PLEASE NOTE**

Do not use chemicals, brushes, rough cloths, high-pressure cleaners or steamers to clean the glider, as these can damage the fabric coating and weaken it. The glider becomes porous and loses braking strength.

Do not under any circumstances put the glider in the washing machine. Even if washing powder is not used, the glider would be badly damaged by the mechanical action of the machine. Do not put the canopy into a swimming pool - chlorine will damage the fabric. If you have no choice but to rinse the glider, e.g. following a landing in the sea, gently wash it down inside and out with fresh water. Frequent rinsing accelerates the aging process.

If you do have to clean the glider, use only lukewarm fresh water and a soft sponge. Use a weak soap solution for stubborn stains, and then rinse it out carefully and thoroughly. Leave the glider to dry in a place which is well-ventilated and in the shade.

## 07 Repairs, Inspections and Warranty

### Type designation

SWING Speedwings have a precise marking on the centre rib, which is mandatory for Speedwings. All required information is specified in the airworthiness requirements.

If you have any questions for your SWING dealer or when ordering spare parts and accessories, it is an advantage if you can provide the type designation and serial number of the Speedwing to ensure clear identification.

### Spareparts

In general, only original spare parts may be used for maintenance and repair.

Spare parts such as lines, risers and associated fittings, brake handles and self-adhesive repair material can be obtained either directly from SWING or from your SWING dealer.

Repair material particularly for sewing work on the canopy is available from SWING only for authorized SWING workshops.

### Repairs

#### Small repairs to the glider

You can repair small tears in the wing yourself using self-adhesive sail material, provided that the tears are in places which do not bear heavy loads, are not at the seams and are no bigger than 3cm.

Single replacement lines for the MIRAGE 2 RS can be ordered direct from us at:

[info@swing.de](mailto:info@swing.de)

The replacement of complete groups of lines must be carried out by a SWING authorised workshop.

### SWING workshops

All repairs and servicing should be carried out by a SWING authorised workshop or directly by SWING. SWING workshops have trained staff, original SWING parts and the necessary know-how, all of which will ensure top quality.

### Regular inspections

The following parts and materials must be inspected regularly for damage, abrasion and correct operation, e.g. after landing:

- Risers and quick-links
- Lines
- Fabric

### Lines



#### PLEASE NOTE

Environmental conditions such as high temperatures or moisture can affect line length.

Check the line length regularly, particularly if you notice any change in launch or flight behaviour.

The line length should be checked if you have landed in water or if the lines have got wet through.

The lines have a significant influence on flight behaviour. Correct line length and symmetry are also important for performance and handling. Measuring line length is part of regular Speedwing inspection. For this purpose, the lines must be loaded with a 5kg weight so as to ensure reproducible results that can be compared with the lengths in the check sheets. Line lengths for the MIRAGE 2 RS are given in the Maintenance and Service Book.

SWING recommends regular inspection of the lines after one year or every 30 hours airtime. It is sufficient to inspect just the main lines when checking trim. The main lines are susceptible to the biggest changes, as they are very long compared to the upper cascade lines and are under high load. With the MIRAGE 2 RS, all main lines in one group must be the same length at closed trimmers (AI, BI, CI is the first group, AII, BII, CII the second, and AIII, BIII, CIII the third). The maximum difference between individual line lengths is 10mm. If the difference is greater, please send your glider to SWING or a SWING authorised workshop to be checked and adjusted.



**WARNING**

Do not under any circumstances use knots to shorten the lines. Any knot will weaken the line considerably and may cause the line to break in case of high load.

The overhand knot and bowline knots described are permitted only for connecting the main brake lines/brake handle.

Lines age and lose strength even if the paraglider is used infrequently or not at all. This can affect the safety and function of your Speedwing. Signs of wear are slight bumps or changes in flying characteristics. The lines must then be replaced immediately.



**WARNING**

A damaged line can result in loss of control of the glider. Always replace lines which are damaged.

If you need to replace damaged or worn-out parts, use only original parts or approved parts from the manufacturer.

Use only inspected and approved lines, which can be obtained through SWING.

**Inspection**

**General**

To ensure that the same high level of operational safety and reliability is guaranteed for your Speedwing in the future, you should follow the SWING service programme in the service and inspection booklet.

Failure to comply with the inspection intervals will invalidate the warranty and the operating licence. A properly kept flight log with details of all flight and training hours will help you to determine the deadlines in good time.

You will find detailed information about the re-inspection in the two supplementary brochures "Re-inspection Instructions" and "Service and Inspection Booklet", both of which are part of these Operating Instructions.

Both brochures can be downloaded from the SWING website.

**Inspection periods**

After 100 operating hours or 24 months, whichever comes first, the MIRAGE 2 RS must be checked according to the inspection instructions. If damaged or worn parts need to be replaced, use only original parts from SWING Flugsportgeräte GmbH.

**Validity of inspection**

It is very important that your glider is serviced at the required intervals throughout its entire life.

Please be aware here of the specific requirements set out in the maintenance instructions.

In order to benefit from SWING's warranty:

- you must have your Speedwing inspected by SWING or an inspection agent authorised by SWING
- the documentation and the result of the inspection must be clearly identifiable (date and place / name of the inspector) and be entered near the glider information/certification sticker.

The liability and warranty of SWING Flugsportgeräte GmbH will lapse if the inspection is carried out by the pilot or a not authorised person.

The DHV recommends that inspection is carried out by the manufacturer/importer or by an



### PLEASE NOTE

Read the service and inspection booklet and follow the regulations to ensure the validity of the SWING warranty, operating permit and insurance cover.

### Checking by yourself

The liability and warranty of SWING Flugsportgeräte GmbH expires in the event of a hand inspection.

## 08 SWING on the World Wide Web

### SWING Website

SWING offers a comprehensive programme on the World Wide Web to provide you with additional information about your MIRAGE 2 RS and many other speedwing topics. The SWING website is the first address for the worldwide SWING fan community: [www.SWING.de](http://www.SWING.de).

On the SWING website you will find, besides additional information and accessories for your MIRAGE 2 RS, a wide range of accessories for your Speedwing as well as useful products for pilots.



Furthermore, you will find all links to our offers and pages in the World Wide Web:

- Service
- Spare parts
- Facebook, Twitter & youtube

This website and its contents are made available for your use. The contents of the SWING World Wide Web pages are provided in their current form and state. SWING reserves the right to change the pages or to block access to them at any time.

### Facebook, Twitter & youtube

SWING is very active with the new media of Facebook, Twitter and youtube and has various websites which are updated daily on various topics related to aviation and SWING products.

## Speedflying Team

Visit the fan page of the SWING Speedflying Team for discussions and the latest info:



<http://www.facebook.com/pages/SWING-Speedflying-Team/150047078156>

## Instagram



<https://www.instagram.com/SWINGparagliders/>

Tag your SWING MIRAGE 2 RS photos that you upload to your social media profiles with:

#SWINGParagliders

#SWINGSpeedflyingTeam

#MIRAGE2RS

More page:



<http://twitter.com/SSTspitfire>

Now we wish you a lot of fun with your MIRAGE 2 RS!

Your

SWING Team

## Appendix

### Addresses

#### SWING Flugsportgeräte GmbH

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Germany

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Email: info@SWING.de

www.SWING.de

#### Paraglider recycling

SWING Flugsportgeräte GmbH

- Recycling Service -

An der Leiten 4

82290 Landsberied

Germany







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