



*designed by:*



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# **SCORPIO**

Manual (EN)



## INFORMATION

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

**[www.powerplay-gliders.de](http://www.powerplay-gliders.de)**

which gives additional information relating to your paraglider and any changes to the Manual. There is further information about the Powerplay website in the section "Powerplay on the World Wide Web".

The date and version number of this Manual are given on the front page

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## DEAR SCORPIO PILOT

THANK YOU FOR PURCHASING A POWERPLAY PRODUCT!

Powerplay is the brand name for Swing Flugsportgeräte GmbH's range of paramotor gliders. We hope that flying a Powerplay glider will bring you many years of enjoyment.

The innovative design, first-rate materials and high quality workmanship of your glider set it apart from others. Your Powerplay glider was developed to comply with all of the current safety and certification requirements in Germany.

One of those requirements is that you familiarise yourself with the information and instructions contained in this Manual regarding safety, equipment and service before using your new glider.

If you have any questions which are not answered in this Manual, please do not hesitate to contact Powerplay directly or your Powerplay dealer. Our contact details are in the Appendix.

The Powerplay Team



### **WARNING**

**Read this Manual before using your glider!**

**The design of this glider means that some flight manoeuvres cannot be performed according to the requirements in the type approval.**

## Contents

<b>01 INTRODUCTION .....</b>	<b>8</b>
MANUAL.....	8
<i>Special text</i> .....	8
<i>Series of instructions</i> .....	8
<i>Lists of parts</i> .....	8
<i>Bullet points</i> .....	8
<i>Paraglider Manual on the Internet</i> .....	8
<i>Powerplay and the environment</i> .....	9
<i>Respect for nature and the environment</i> .....	9
<i>Environmentally-friendly recycling</i> .....	9
<b>02 SAFETY.....</b>	<b>10</b>
SAFETY ADVICE .....	10
SAFETY NOTICES.....	11
DISCLAIMER AND EXCLUSION OF LIABILITY, OPERATING LIMITS .....	11
CERTIFICATION AND DIRECTIVES .....	12
<i>LTF certification</i> .....	12
<i>Description of flight characteristics</i> .....	12
<i>Target group and recommended flying experience</i> .....	13
<i>Description of pilot skills required</i> .....	13
<i>Suitability for training</i> .....	13
<b>03 TECHNICAL DESCRIPTION.....</b>	<b>14</b>
GENERAL LAYOUT ILLUSTRATION .....	14
SCORPIO - PURE PERFECTION .....	14
LINE SYSTEM .....	15
RISERS .....	16
TECHNICAL INFORMATION AND MATERIALS .....	17
<b>04 SETTING UP THE SCORPIO AND TEST-FLYING .....</b>	<b>18</b>
BEFORE THE FIRST FLIGHT .....	18
<i>Harness adjustment</i> .....	18
<i>Adjusting the main brake lines</i> .....	18
<i>Wing tip brake setting</i> .....	20
<i>Adjusting the brake handle</i> .....	21
<i>Adjusting the speed system and trimmers</i> .....	22
<i>Two-tier speed system</i> .....	25

CERTIFIED HARNESSES .....	26
RESERVE.....	26
RECOMMENDED WEIGHT RANGE .....	26
FIRST FLIGHT .....	27
<b>05 FLYING THE SCORPIO .....</b>	<b>28</b>
LAYING OUT THE PARAGLIDER AND PRE-FLIGHT CHECK .....	28
LAUNCH CHECK.....	28
LAUNCH .....	29
<i>Forwards launch</i> .....	29
<i>Reverse launch</i> .....	29
CLIMBING .....	30
COUNTER-TORQUE OSCILLATION .....	31
CRUISING .....	31
<i>Level flight</i> .....	31
<i>Turns using main brake</i> .....	31
<i>Turns using the wing tip brake</i> .....	32
<i>Using the torque compensator</i> .....	32
LANDING .....	32
<i>Landing with stationary propeller</i> .....	33
<i>Landing with motor running</i> .....	33
FURTHER TIPS ON PARAMOTORING .....	33
RAPID DESCENT METHODS .....	33
<i>Spiral dives</i> .....	33
<i>B-stall</i> .....	35
<i>Big Ears</i> .....	35
<b>06 TYPES OF USE .....</b>	<b>36</b>
HILL LAUNCHES.....	36
WINCH LAUNCH.....	36
TANDEM/SOLO USE .....	36
AEROBATICS.....	36
<b>07 DANGEROUS SITUATIONS AND EXTREME FLYING.....</b>	<b>37</b>
DANGEROUS SITUATIONS.....	37
SAFETY TRAINING .....	37
<i>Material stress and damage</i> .....	38
COLLAPSING THE PARAGLIDER.....	38
<i>Asymmetric collapse</i> .....	38
<i>Asymmetric collapse with tangling</i> .....	38

<i>Front stall</i> .....	39
TYPES OF STALL .....	39
<i>Deep stall</i> .....	40
<i>Full stall</i> .....	40
<i>Spin</i> .....	40
<i>Emergency steering</i> .....	41
OTHER TIPS FOR DANGEROUS SITUATIONS .....	41
<i>Stalling in rain</i> .....	41
<i>Advertising and adhesives</i> .....	42
<i>Overloading</i> .....	42
<i>Sand and salt air</i> .....	42
<i>Temperature range</i> .....	42
<b>08 STORING AND LOOKING AFTER THE PARAGLIDER.....</b>	<b>43</b>
STORING THE PARAGLIDER .....	43
<i>Packing the paraglider</i> .....	43
<i>Storing and transporting the glider</i> .....	44
LOOKING AFTER THE PARAGLIDER .....	45
<i>Fabric</i> .....	45
<i>Lines</i> .....	45
<i>Cleaning</i> .....	46
<b>09 REPAIRS, INSPECTIONS AND WARRANTY.....</b>	<b>47</b>
TYPE DESIGNATION .....	47
REPAIRS .....	47
<i>Powerplay workshops</i> .....	47
<i>Small repairs to the glider</i> .....	47
REGULAR INSPECTIONS .....	47
<i>Lines</i> .....	47
INSPECTION .....	48
<i>General</i> .....	48
<i>Inspection periods</i> .....	48
<i>Validity of inspection</i> .....	48
<i>Inspection by the pilot</i> .....	48
WARRANTY .....	49
<b>10 POWERPLAY ON THE WORLD WIDE WEB.....</b>	<b>50</b>
POWERPLAY WEBSITE .....	50
PRODUCT REGISTRATION .....	50
POWERPLAY-ONLINE SHOP .....	50

FACEBOOK, TWITTER & YOUTUBE.....	50
<b>11 APPENDIX .....</b>	<b>51</b>
ADDRESSES .....	51
VERSIONS .....	51
<i>Version 1.1</i> .....	<i>51</i>

# 01 Introduction

## Manual

We recommend that you familiarise yourself with your new paraglider by reading this Manual before your first flight. This will allow you to acquaint yourself its new functions, to learn the best way to fly the paraglider in various situations, and explain how to get the best out of your paraglider.

Information in this Manual on design of the paraglider, technical data and illustrations are subject to change. We reserve the right to make changes without prior notification.

The Manual complies with the LTF guidelines (version current at the time of certification) and forms part of the certification.

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## Special text



### WARNING

Sections of text headed "Warning" 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.



### IMPORTANT

Sections of text headed "Important" indicate that there is a risk of damage to property.



### 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 and 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 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.powerplay-gliders.de](http://www.powerplay-gliders.de).

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



## **Powerplay and the environment**

Protection of the environment, safety and quality are the three core values of Powerplay 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.

In particular, avoid flying at low altitude under motor over residential areas and nature reserves.

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

## **Environmentally-friendly recycling**

Powerplay 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, Powerplay 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 Safety



### WARNING

The safety advice given below must be followed under all circumstances. Failure to do so renders invalid the certification and/or results in loss of insurance cover, and could lead to serious injuries or even death.

### Safety advice

All forms of aerial sport involve certain risks. When compared with other types of aerial sport, paragliding has the lowest number of fatal accidents measured according to the number of licensed pilots.

However, few other sports demand such a high level of individual responsibility as paragliding. Prudence and risk-awareness are basic requirements for the safe practice of the sport, for the very reason that it is so easy to learn and practically anyone can do so. Carelessness and overestimating one's own abilities can quickly lead to critical situations. A reliable assessment of conditions for flying is particularly important. Paragliders are not designed to be flown in turbulent weather. Most serious paraglider accidents are caused by pilots misjudging the weather for flying.

Paragliders themselves are extremely safe. In the type certification tests, all component parts of a paraglider must withstand many times the load of normal flight. There is a three-fold safety margin compared to the maximum extreme load occurring in flight. This is higher than the two-fold margin usual in aviation. Accidents caused by material failure are therefore practically unheard of in paragliding.

In Germany, paramotor wings are subject to the relevant civil aviation laws on aerial sports equipment exempt from testing (see in particular German Air Traffic Licensing Ordinance (LuftVZO) sec. 1(4) and German Ordinance on Aircraft and Aeronautical Products (LuftGerPV) sec.10a. The Scorpio is intended solely for motorised use and should only be flown with a valid certification and in combination with a motor unit which has been tested for compatibility. Any independent experimentation is extremely dangerous.

A specialist must test-fly and inspect the paraglider before your first flight. The test-flight must be recorded on the paraglider information label.

Carry out your first flight with the glider in ideal conditions and at a site with which you are familiar. For this flight and for all other flights, you must wear an approved helmet, gloves, firm shoes with ankle-support and suitable clothing. Only fly from approved flying areas and if the wind direction, wind speed and current and forecasted weather conditions guarantee a safe flight.

The Manual must be passed on to the new owner if the paraglider is sold. It is part of the certification and belongs with the paraglider.

Any use other than as intended is not permitted.

A paramotor wing should be used only for that purpose. It should only be used for free flying as well if it also has type certification under the provisions of the rules for the operation of paragliders. Do not under any circumstances use it as a parachute. Acrobatics are not permitted.

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

## Safety notices

Safety notices are issued when defects arise during use of a paraglider which could possibly also affect other gliders of the same model.

The notices contain instructions on how to inspect the gliders concerned for possible faults and the steps required to rectify any faults.

Powerplay publishes on its website any technical safety notices and airworthiness instructions which are issued in respect of Powerplay products. We will also send you safety notices directly by email if you have registered your product (refer to "Product Registration" in the section "Powerplay on the World Wide Web").



### WARNING

The paraglider owner is responsible for carrying out the action required by the safety notice.



Safety notices are released by the certification agencies and are also published on the relevant websites. Services such as RSS are also available which allow

internet users to follow various websites and changes to them without having to access them individually. This allows much more information to be followed than was previously the case. You should therefore visit the safety pages of the certification agencies on a regular basis and keep up-to-date with new safety notices which cover any products relating to paragliding (refer to Appendix for addresses).

## Disclaimer and exclusion of liability, operating limits

Use of the paraglider is at the pilot's own risk!

The manufacturer cannot be held liable for any personal injury or material damage which arises in connection with Powerplay paramotor gliders. The certification and warranty are rendered invalid if there are changes of any kind (incl. paraglider design or changes to the brake lines beyond the permissible tolerance levels) or incorrect repairs to the glider, or if any inspections are missed (annual and 2-yearly check).

Pilots are responsible for their own safety and must ensure that the airworthiness of the glider is checked prior to every flight. The pilot should launch only if the paraglider is airworthy. In addition, when flying outside of Germany, pilots must observe the relevant regulations in each country.

The glider may only be used if the pilot has a licence which is valid for the area. There is no liability on the part of third parties, in particular the manufacturer and the dealer.

In terms of the warranty and guarantee conditions, the paraglider may not be flown if any of the following situations exists:

- the inspection period has expired, or the inspection has been carried out by the pilot him/herself or by an unauthorised inspector
- the take-off weight is not within the permissible weight range
- the glider is flown in rain or drizzle, cloud, fog and / or snow
- the temperature is below -10°C
- there are turbulent weather conditions or wind speeds on launch higher than 2/3 of the maximum flyable airspeed of the glider (varies according to the total take-off weight)

- the glider is used for aerobatics/extreme flying or flight manoeuvres at an angle greater than 90°
- the pilot has insufficient experience or training
- the pilot has incorrect or inadequate equipment (reserve, helmet etc)
- the glider is used in combination with a motor which has not been tested for compatibility
- there have been modifications to the canopy, lines or risers which have not been approved

## Certification and directives

The approved testing bodies have worked in conjunction with the manufacturers and the appropriate associations to develop directives for certification which are based on many years of analysing paraglider accidents and on the experience of flying schools, flying instructors and safety officers. These directives are intended to ensure that the only paragliders used are those whose flying characteristics were tested by independent bodies and which offer a minimum level of safety.

This should help pilots to select the glider which is appropriate for their particular level of flying ability.

There is also further information on the website of the relevant licensing body.



### WARNING

The descriptions of flight characteristics contained in this Manual are all based on test flights, which were carried out under standardised conditions.

The complexity of the paraglider system means that the standardised tests can give only a partial description of the glider's flight behaviour and reactions to disturbances.

Even a small alteration in individual parameters can result in flight behaviour which is markedly modified and different from the description given.

## LTF certification

The Scorpio was tested by the European Para Academy (EAPR) in accordance with the current LTF directives. Type certification was granted.

The following canopy stability problems were not included in the type-testing because of the design:

- asymmetric collapse with 70% collapse
- accelerated collapse (frontal collapse and asymmetric collapse)

## Description of flight characteristics

Paraglider with a moderate level of passive safety and potentially dynamic reactions to turbulence, canopy problems and pilot error. Recovery to normal flight may require precise pilot input.

## Target group and recommended flying experience

Powerplay recommends that paramotor wing pilots meet the following minimum requirements before flying the Scorpio:

- extensive flying experience of at least 75 hours airtime per year
- extensive knowledge of the special features of paragliders with reflex profiles

The Scorpio is not suitable as a wing for beginner paramotor pilots. On the contrary, pilots should already have experience with paramotor wings and be familiar with the performance and safety of gliders with reflex profiles.

The Scorpio covers many aspects of powered paragliding and offers various adjustment options to adjust the glider's

characteristics according to the pilot's wishes. The adjustments require appropriate experience on the part of the pilot, in order to use the Scorpio's full range of performance and handling.

## Description of pilot skills required

Designed for pilots well-practised in techniques to recover from abnormal flying conditions, who fly regularly, "actively", and who understand the possible implications of flying a paraglider with reduced passive safety.

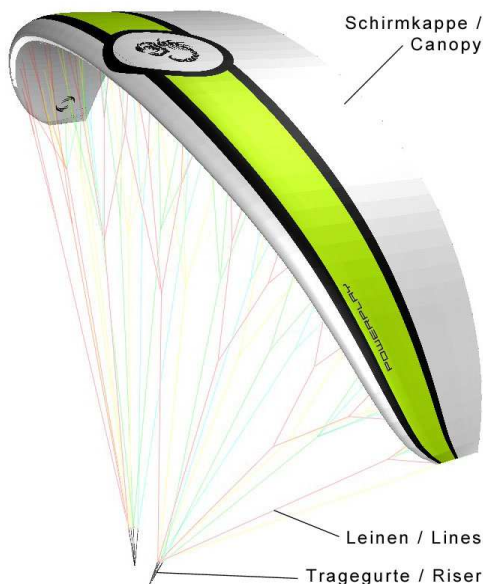
Reflex profiles require a correct assessment of operating limits in order to avoid canopy disturbances safely.

## Suitability for training

The Scorpio is generally not suitable for use as a training glider.

## 03 Technical Description

### General layout illustration



**Fig. 1:** Scorpio CAD-design

Exact descriptions and other detail drawings are given in the various sections and in the Maintenance and Service book.

### Scorpio - pure perfection

The Scorpio is one of the highlights in its category. It is dynamic and timeless, and has an even more sporty appearance.

The Scorpio was developed in close collaboration with producers of motors and experienced paramotor-pilots. They provided support for the project right from

the outset and their know-how assisted the progression from the prototype stage through to series manufacture.

The result is an innovative, well-engineered paramotor glider which offers dynamic handling and high speed – features which will quicken the heart of every paramotor pilot.

New ideas were put into practice in developing the Scorpio and implemented in a reflex concept for the first time. The reflex technology increases performance and speed with the same high level of stability.

Powerplay's development team gave the Scorpio a very distinctive and sporty appearance. Combined with an innovative design, logo and colours, the Scorpio is the highlight of the skies.

A design priority was to have a small surface area with high wing-loading.

The advantages of this are:

- very uncomplicated launch behaviour
- high level of canopy stability
- high speed
- high agility and dynamics

In addition, motor thrust was taken into consideration in computer calculations of the pilot position, and canopy geometry was optimised according to the specific demands of powered paragliding. As a result, the Scorpio does not lag behind the pilot in flight. Combined with the low line resistance, the result is excellent flight performance.

The playful handling is exceptional and its performance equally so. This combination and the impressive agility stemming from the completely new brake-line attachment make the Scorpio a promising XC-star for the future.

Pilots who choose a Scorpio get a comfortable advantage when it comes to sportiness, dynamics and performance.

## Line system

The Scorpio has A, B, C and D line levels, which fork twice from the bottom (riser) to the top (canopy) and which are divided into main, intermediate and top lines. The individual line levels are connected with one another using the "handshake knot" (loop to loop knot).

The Maintenance and Service book has a detailed line connection plan, showing the individual levels, connections and line descriptions.

With the brake lines, the individual levels are bundled at the end with the main brake line. This runs through the brake pulley attached to the riser and is knotted at the brake swivel of the control handle. There is a mark on the main brake line which allows the control handle to be correctly positioned.

In addition to the main brake line, the Scorpio has line linkages for a wing-tip brake and torque compensator. There is more on this in the section "Risers".

The main lines are all attached to the risers' Maillon quick links. They are fed through special elastic rings and attached to prevent the lines from slipping and to ensure that they stay in the correct position.



## WARNING

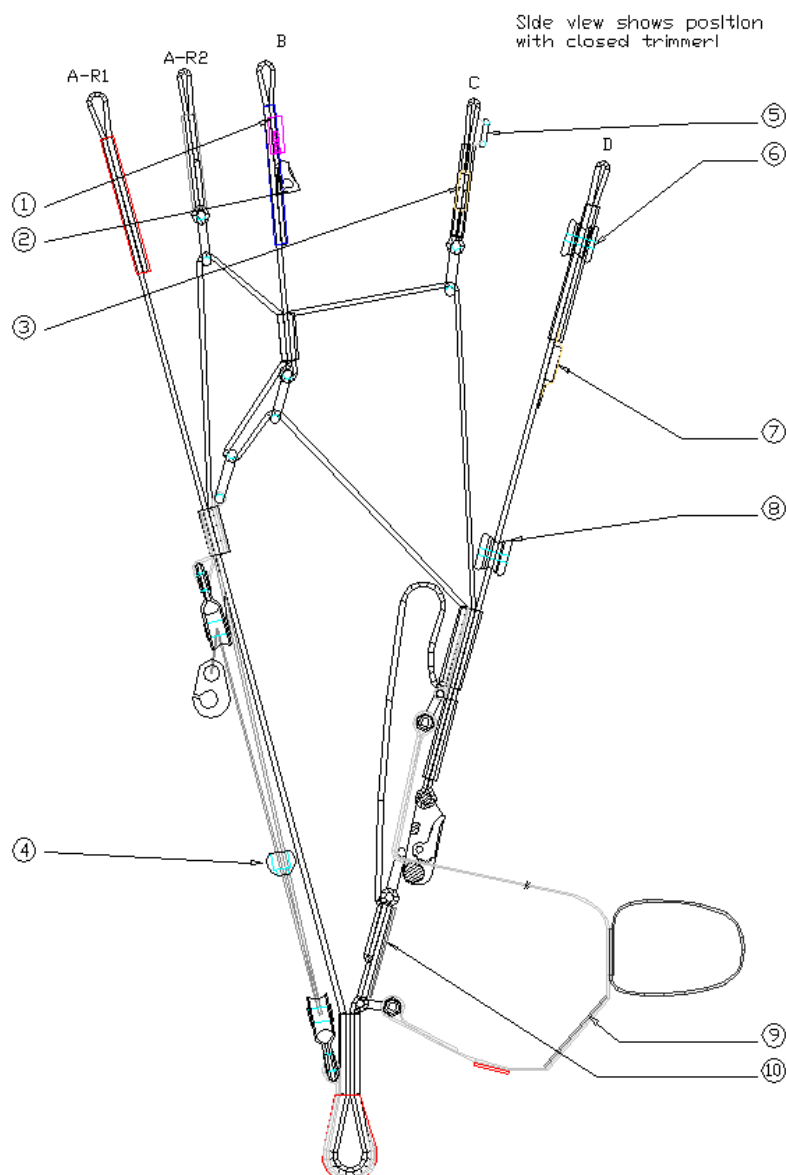
The paraglider is delivered ex factory with the Maillon quick links secured using a strong thread-locking compound Loctite© to prevent unintentional opening. After service work, quick links which have been opened must be secured again against unintentional opening.

The service intervals for the lines given in the Maintenance and Service book must be observed under all circumstances.

The Scorpio has unsheathed lines with diameters of less than 1mm. There is a risk of the lines breaking if there is improper use or if service intervals are not observed.

## Risers

Fig. 2: Risers





The risers were developed specially for the Scorpio with a new type of trimmer system, and this ensures a great increase in speed by effectively altering the angle of attack across all riser levels. In addition, a “wing tip brake” and torque compensator give the option of steering the glider independently and adjusting it to the motor output. This ensures maximum flexibility in adapting it to the particular drive system and takes into consideration the specific requirements of paramotor pilots.

The Scorpio's risers, at 480 mm, are much shorter in comparison to normal mountain gliders. This allows better adjustment of different position attachment points of the motor unit/harness. Two brake line-pulleys help to set the optimal position for the brake lines.

The individual parts of the Scorpio risers at a glance:

- 1 locking clip for torque compensator
- 2 torque compensator line
- 3 magnetic mount wing tip brake
- 4 stop ball
- 5 ring guide for the wing tip brake
- 6 upper brake line pulley
- 7 main brake magnetic mount
- 8 lower brake line pulley
- 9 interchangeable trimmer strap
- 10 trimmer strap velcro holder

The section “Flying the Scorpio” has further information on using the acceleration system, the wing tip brake and torque compensator.

The brake handles are attached to the riser by strong Neodym magnets. The advantage of the magnets is that the brake handles can simply be attached to the risers during flight.

## Technical information and materials

The Maintenance and Service book has detailed technical information, including take-off weight, design information and speed range. It also includes extensive information about the canopy and line material used and forms part of this Manual.

## 04 Setting up the Scorpio and test-flying

### Before the first flight



#### WARNING

A specialist must test-fly and inspect the glider before your first flight. The test-flight must be recorded on the glider information label.

During production, the Scorpio goes through several quality control checks before finally undergoing a detailed 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 paraglider render invalid the certification and warranty.

### Harness adjustment

Before flying the Scorpio for the first time and whenever the motor is changed, we strongly recommend hanging from a frame with the complete drive unit, to check that the brakes can be reached and to make sure that the harness is properly adjusted. Ideally, this should be done under the supervision of a flying instructor or, if not, then at least a very experienced and conscientious paramotor pilot.

### Adjusting the main brake lines

The Scorpio is delivered ex factory with a brake adjustment marked which complies with the test sample and which should not be altered. This adjustment will allow you to steer and land the glider almost immediately with most motors.

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.

#### Factory setting

Correctly installed brake lines have about 10cm of feed. This is how far you must pull down the brakes before the trailing edge of the paraglider starts to move downwards and begins to brake. Note that the brake cascades already cause drag by their aerodynamic resistance.

The factory setting for the Scorpio's main brake lines is through the upper pulleys on the D-risers.

#### Adjustment to suit hangpoint height

For trikes or older harnesses, designed with the main hangpoint very high, there is the option of feeding the brake line through the lower pulley.

When using the lower pulley, the main brake line must be lengthened. The lower mark on the main brake line gives the reference point for this.

Modern gliders such as the Scorpio have lower tolerance with regard to brake adjustment. Length adjustments are therefore generally not necessary.

If you nevertheless adjust the brake position, you must under all circumstances keep within the tolerance levels given in the Maintenance and Service book.



## IMPORTANT

Alterations to the main brake lines should be carried out by a flying instructor or by an experienced pilot.

Always have the trimmers closed when carrying out alterations to the main brake lines.

It is essential to check the adjustment of the main brake lines after changing the drive system.

### Incorrect adjustment

If the brake lines are too long, the paraglider reacts slowly and is difficult to land. The brake lines can be adjusted during flight by wrapping them around your hands which will improve the flight characteristics. Adjust the brake lines to the correct length after you have landed. Changes to the braking distance should always be made in small increments of no more than 2 to 3cm and must be tested on a training slope. The left and right brakes must be adjusted symmetrically.

If the brakes are shortened, care must be taken that the paraglider 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.



## WARNING

The glider must not under any circumstances be pre-accelerated as a result of the adjustments to the brakes (even with open trimmers). The glider should first be inflated and checked after any alteration.

Be aware that the available braking distance is reduced if the main brake line runs through the lower pulley as well.

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

- there could be an early stall
- the paraglider does not launch well and there is a risk of deep stall
- the paraglider exhibits dangerous behaviour in extreme flying
- the trailing edge of the paraglider is braked in accelerated flight which, in an extreme case, could cause a frontal collapse

If there is more than 10cm left over below the knot after making an adjustment, then cut off the extra length.

## Wing tip brake setting

The wing tip brake is delivered ex factory adjusted to the main brake line setting. You should adjust the wing tip brake by the same amount that you alter the length of the main brake line.

If you do not use the Wing Tip Brake, it can simply be removed. Untie the knots on the brake handle and unloop the main lines and upper brake lines.



### IMPORTANT

The wing tip brake is not held during launch, so it must be secured using the drawstring stopper. Pull the main line through the drawstring stopper to the end of the wing tip brake handle. This ensures that the wing tip brake handle does not get caught in the propeller if it is unintentionally undone during launch.

## Brake knots

The overhand knot and bowline knot shown below are the most suitable for connecting the brake line to the brake handle.

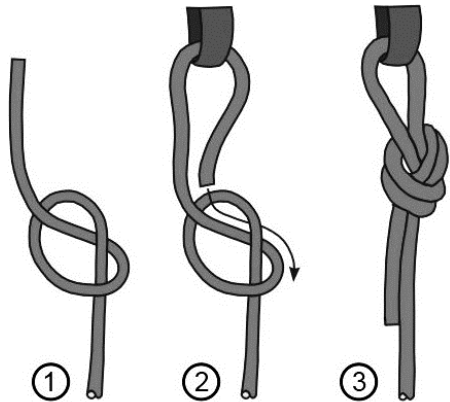


Fig. 3: Overhand knot

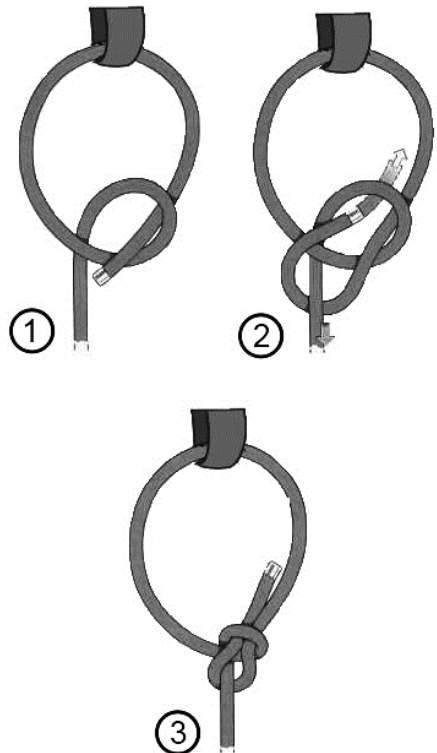


Fig. 4: Bowline knot



## 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 or bowline knots are used and that they are tied correctly.

## Adjusting the brake handle

The Scorpio is fitted with Powerplay's Multigrip brake handles, which allows the stiffness of the grip area to be adjusted. The various options for stiffening the brake handles allow them to be adjusted to suit the pilot's particular preferences. There are 4 levels of stiffness possible using various combinations of the stiffening options. The pilot is able to choose the appropriate degree of stiffness by simply taking out or inserting the various parts.

**Fig. 5:** How to insert and remove the stiffeners into Powerplay's Multigrip brake handle

**A**



Multigrip brake handle on delivery with both stiffeners

**B**



To remove the stiffeners, turn the Multigrip brake handle inside out and push the two small rods out through the opening

**C**



Multigrip brake handles after removing both stiffening rods. These are the various parts:

- 1** Firm stiffening (bar)
- 2** Soft stiffening (tube)
- 3** Multigrip brake handle without stiffening
- 4** Brake swivel
- 5** Main brake line

The procedure is the same to insert the stiffeners: turn the Multigrip brake handle inside out and push the two small rods into the handle again through the opening.

There is also a swivel **4** where the brake lines/brake handles connect to prevent the brake lines from twisting.

## Adjusting the speed system and trimmers

Use of a reflex profile means that the Scorpio has special features which must be taken into consideration when using the speed system and the trimmers.

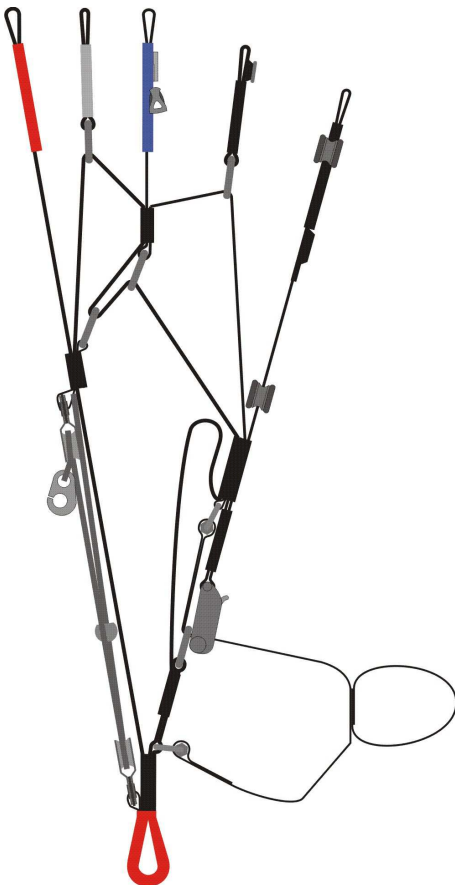
The Scorpio has a high basic trim speed even with neutral trimmer position, and this can be increased considerably by using the additional speed system and the trimmers. This gives the pilot a wide speed range, with which to make the ideal adjustment to cruise speed.

When using a reflex glider, flying at maximum and minimum speed should only be done with sufficient altitude and experience.

Correct use of the speed system and trimmers is very important with reflex profiles. Therefore, study closely the comments with Figs. 6a – 6e, which show the various settings and positions.

### Closed trimmers (Fig. 6a)

Because of the Scorpio's high trim speed, we recommend selecting the setting with closed trimmers for launch and landing (the D-riser is shortened by 30 mm). This setting is also suitable for flying in thermals because of the reduced sink rate.



**Fig. 6a:** Closed trimmers

Neutral trimmers (Fig. 6b)

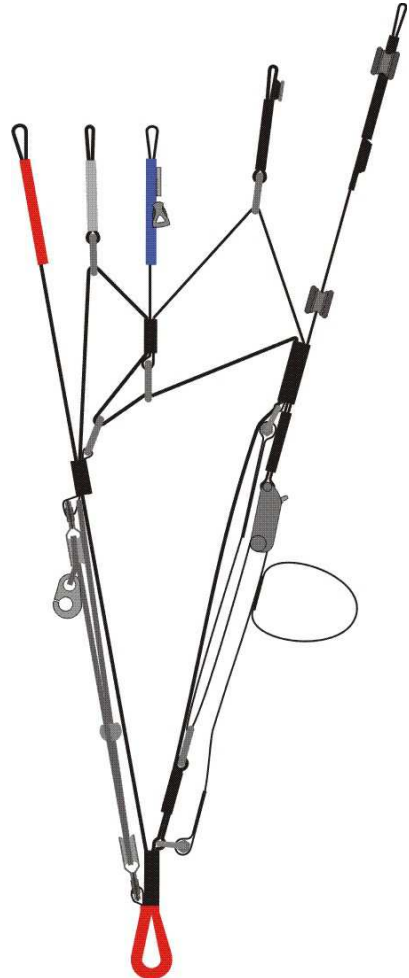
In the neutral position (all risers the same length) the reflex-profile is formed. This setting offers dynamic handling, a high level of stability and a good cruise speed.



**Fig. 6b:** Neutral trimmers

Open trimmers (Fig. 6c)

When the trimmers are fully open (the D-riser is lengthened by 90 mm) the reflex-profile forms completely. Brake pressure is noticeably tighter, while speed, performance and stability are very high.



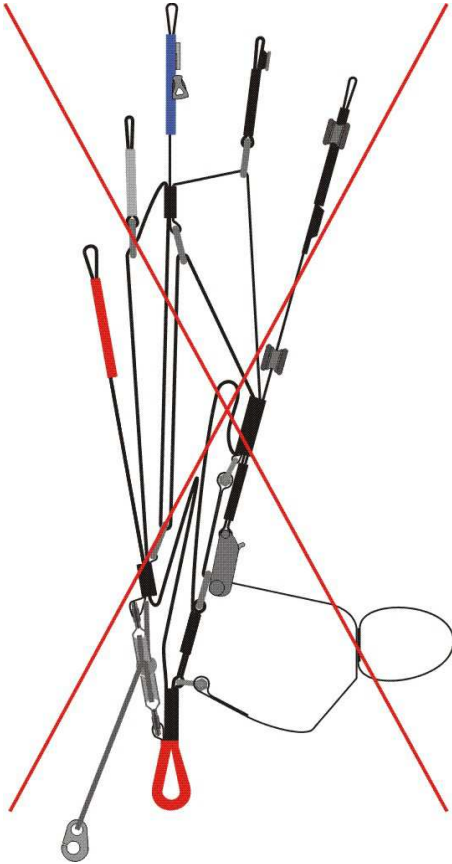
**Fig. 6c:** Open trimmers

### Closed trimmers and use of the speed bar (Fig. 6d)



## **WARNING**

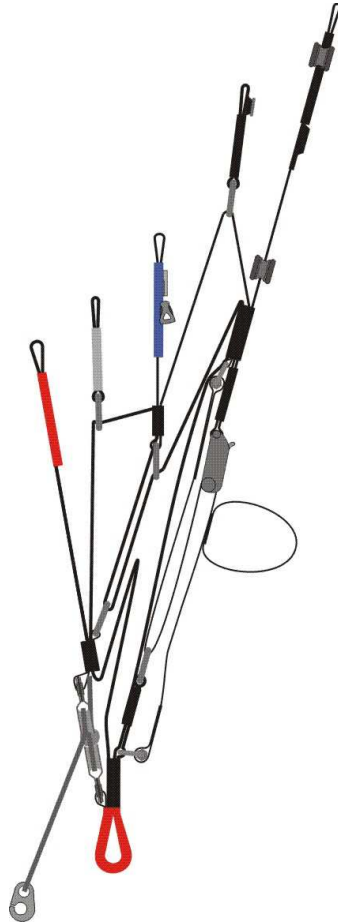
When the trimmers are closed, use of the speed bar is forbidden. This configuration produces an extremely unstable profile and there is the risk of front stall or other extreme flight manoeuvres.



**Fig. 6d:** Closed trimmer and use of the speed bar

### Open trimmers and use of the speed bar (Fig. 6e)

When the trimmers are fully open and the speed bar is used (the D-riser is lengthened by 90 mm and the A-riser is shortened by 175 mm by the speed bar) the profile is fully reflexed.



**Fig. 6e:** Open trimmers and use of the speed bar



Brake pressure increases in this speed range. Steering with weight-shifting and the wing tip brakes is much more effective at high speeds than using the main brakes.

## Two-tier speed system

The Scorpio has specifically designed risers which allow pilots to use a variable transfer speed system to adjust the speed bar extension range and pressure to best suit their own leg length and position.

It is important that the speed system is correctly installed and adjusted to ensure that it can be used smoothly during flight. Before first launch, therefore, the length should be adjusted according to the individual pilot and the line guide should be checked.

Special Brummel-hooks are used for the connection between speed bar and riser. It is wise to adjust the line length so that the pilot's legs are fully stretched when flying at maximum acceleration (the two riser pulleys together). If this is not done, fatigue can be caused if used this way over a long period of time. When you have applied the speed system fully, you should still be able to take up a comfortable seating position.

After the speed bar has been adjusted according to the length of the pilot's legs or the harness, then the two-stage speed system is adjusted. This system has two ball-bearing pulleys which reduce the acceleration pressure, thereby allowing comfortable acceleration even when the pilot's legs are bent. A stop ball then blocks the lower pulley, reducing the acceleration distance, and effectively converting every centimetre into speed.

The position of the stop ball can be varied. This allows pilots to alter the speed bar according to their own preferences, and to adjust the speed bar extension range and

pressure ergonomically according to leg length, the harness and the speed bar used.



**Fig. 7:** Stop ball on the riser's speed bar line

The two-stage speed system can be adjusted using a stop ball, which is attached to the speed system cord by a simple knot. The speed bar distance is increased if the stop ball is pushed upwards. If it is pushed down, then the lower pulley is locked earlier, which reduces the speed bar distance and increases the pressure.

Before launch, fasten the speed bar to the harness to avoid tripping over it when preparing to launch or taking off.



## WARNING

Do not make the speed system too short. The glider must under no circumstances be pre-accelerated as a result of the adjustment being too short. Problems (such as collapses or tucks) have a more drastic effect with increased speed than in unaccelerated flight. It is generally strongly recommended that you do not use the speed system in turbulent areas and when flying close to the ground, because of the increased risk of collapse.

## Certified harnesses

In Germany, the harness (and reserve) used must receive a declaration of conformity and be registered by a type-testing body.

To achieve a satisfactory level of performance with the Scorpio, it is essential to give conscientious thought and consideration to the appropriate harness, motor and propeller.

We are able to give no more than advice on this. The pilot is responsible for the final decision.

Please contact your Powerplay dealer or Powerplay directly if you have any questions about using your harness and motor with the Scorpio.

## Reserve

It is a mandatory requirement to carry an approved reserve for use in emergency

situations where the paraglider fails and recovery is not possible, for example after colliding with another aerial sports craft.

In choosing a reserve, you should be careful that you remain within the specified take-off weight. The reserve must be fitted according to the manufacturer's instructions.

## Recommended weight range

The Scorpio must be flown within the permitted weight range, which is given on the glider information and certification sticker and in the Maintenance and Service book. The weight refers to take-off weight: pilot, incl. clothing, glider, harness, motor and equipment. Determine your take-off weight by weighing yourself with all of your equipment and your backpack.

Powerplay offers the Scorpio in various sizes. If you are choosing between two sizes, your personal flying preferences will determine which glider to choose.

If you prefer very dynamic flight behaviour with fast reactions and without hesitation, you should choose a high wing-loading, i.e. the smaller model.

The dynamics reduce in the medium and lower weight range. Flight behaviour becomes more straightforward and many pilots select this weight range because they find it easier to centre in thermals. If these features appeal to you, you should fly with less wing-loading and choose the larger model.

The Scorpio reacts to weight changes only by slightly increasing or reducing trim speed, with little noticeable influence on glide performance. You can therefore choose the size completely according to your own flying style.

## First flight

Carry out your first flights only during stable weather, and in a familiar area or at an aerodrome circuit.

You should steer gently and carefully to begin with so that you can become accustomed to the reactions of the glider without being under any stress.



### WARNING

Do not overestimate your own abilities.  
Do not allow the behaviour of other pilots to make you careless.

## 05 Flying the Scorpio

The Scorpio was developed for performance pilots with extensive flying experience. The basic types of flying described below should be second nature for such pilots, but have been included in this Manual for the sake of completeness.

Powerplay cannot guarantee that the behaviour described below always applies one hundred per cent to all conceivable combinations of motor and glider.

Compatibility of a new combination must therefore be confirmed by a test flight by an accredited compatibility test pilot.

An application for a compatibility test can be made to a type-testing body either by the manufacturer of the motor or by a pilot (as an individual type-test certification).

### Laying out the paraglider and pre-flight check

Place the paraglider with its upper surface against the ground and spread it out so that the leading edge is slightly curved.

Carefully sort out all the rigging lines and make sure that there are no lines underneath the canopy, tangled or caught up in any way.

Before launching, always check the following:

- Are there any tears in the glider or other damage?
- Are there any knots or tangles in the lines?
- Are the brake lines clear and attached firmly to the handle?
- Are the brake lines adjusted to the correct length?
- Are the quick links to the lines and risers closed and secured?

- Is the canopy dry?
- Are the risers and seams in good condition?
- Is the harness in good condition?
- Is the handle for the reserve chute secure?
- Has there been a pre-flight inspection of the motor unit?



### WARNING

A careful pre-flight check is required for any type of aircraft. Make sure that you exercise the same level of care each time carry out the check. If there are obvious folds in the glider because it has been tightly packed or stored away for a long time, then the pilot should carry out some practice inflations before first launch and smooth out the trailing edge a little. This ensures that the flow profile is correct during launch. It is particularly important in low temperatures that the trailing edge is smoothed out.

### Launch check

The launch point check is carried out immediately before launch to check once again the most important safety points. It should always be carried out in the same sequence so that nothing is overlooked. The points are:

1. Is the canopy arranged in a half-moon shape and are all the air-entrances open?
2. Are all the lines untangled and free of knots or twists? Are there any lines under the canopy? Are any lines caught in the trimmer clamp, risers or throttle? Do all the lines run cleanly past the cage?

3. Has the trimmer position been correctly chosen?
4. Do you have the correct personal equipment (motor unit, harness, carabiners, reserve, helmet). Are the leg straps done up?
5. Does the weather, in particular wind direction and strength, allow a safe flight?
6. Is the propeller clear?
7. Is the motor running properly?
8. Are the airspace and launch area clear?



## IMPORTANT

If the glider goes too far to the side or falls down again, then stop the motor and begin the launch procedure again.

After carrying out the visual inspection, use full throttle. Leaning back slightly helps launch, as the full engine power is used. Release the risers and accelerate until the Scorpio takes off.

Take note of the following points during a forwards launch:

- if the cage for the motor is not firmly in place, the risers can shift it during take-off and press it against the propeller - make sure this has not happened before you fly at maximum power.
- during launch, use of the brakes should be smooth and moderate
- the reflex profile is inherently stable, which means that the canopy continues to fly forwards after reaching its apex, so the glider must be braked no later than here
- do not launch until the glider is above you - accelerating too quickly can cause dangerous pendulum motions
- do not get into your harness until you are a couple of meters in the air
- lower hang point with back motors generally allow an easier launch

## Launch

### Forwards launch

We recommend a forwards launch if there is little wind. Pull up the glider with the lines stretched. It is not necessary to use any momentum to launch the Scorpio and/or to start running with slack lines.

While the glider is rising, guide the A-risers evenly upwards in an arc, without shortening them. Avoid pulling hard on the risers. The Scorpio launches very easily and is easy to control. Launching is even easier if the canopy is arranged in a half-moon shape.

Avoid moving your upper body sideways when the glider is rising, as this could cause lines to get caught in the propeller. If the glider is not centred when it rises, correct it using the risers rather than the brakes. This will stop one side of the glider tipping away. It is important during the take-off phase to remain under the glider and to hold your launch direction. When there is equal tension on both risers and the glider is above the pilot, check that the canopy is fully inflated and that no lines are twisted or caught up. Do not stand still, but keep your upper body still when doing this.

### Reverse launch

The Scorpio is suitable for reverse-launching from wind speeds of 3m/s. The pilot turns around to face the glider with the updraft coming from behind. This method of

launch makes it easier for the pilot to control the rising of the canopy and to carry out fine-tuning, so is therefore recommended in strong winds.

If you wish, you can first clip in to the glider as in a forwards launch and then turn around while the motor is switched off. Guide the lines over the cage and check that none of the lines is caught up.

In very strong winds, we recommend that you attach yourself to the glider when facing backwards. The risers must be set out and attached in such a way that you are in the correct position after you turn around and are not twisted.

By pulling on the front A-lines, the canopy begins to rise above the pilot as in a forwards launch. When the canopy reaches its apex, the pilot must turn around into the direction of flight and can run into the wind and take off. As with a forwards launch the correct combination of brake and throttle is important to achieve the best speed and climb.



## WARNING

The pilot must work actively to keep the glider on the ground in higher wind speeds (from approx. 6 m/s), otherwise the glider may rise above the pilot unintentionally which can lead to the pilot being lifted off, turned and dragged away.

With the reverse launch, you should observe the following special features in addition to the points given under “Forwards launch”:

- with the reverse launch, the correct technique for clipping in, inflation, and turning around is very important. The pilot must master these before points before attempting them with the motor running

- always turn around steadily and briskly into the right direction
- always check when clipping in with risers crossed, that they are not swapped over or twisted in the carabiners



## IMPORTANT

When reverse launching or ground handling, be careful not to loop the brake lines through the risers because this can damage the risers.

## Climbing

Once you are airborne, you may notice the counter-torque i.e. the glider wants to turn against the direction in which the propeller is turning. Focus on a fixed point in the distance and maintain your direction by counter-steering. The Scorpio also has a torque compensator, the use of which is explained in the section “How to use the torque compensator”.

After launch, first fly into the wind and let the Scorpio pick up speed. The Scorpio's increased speed range means that you must be particularly careful especially during your first flights.

Do not climb with too great an angle of attack. Select the rev speed and brake line use so that there is enough speed to keep adequate reserve to stall point.

If the angle of attack is too high when you are climbing, the glider could stall if there is any further increase in the angle of attack e.g. a vertical gust. A further reason for keeping the climb gentle is if there were motor failure at low altitude. If this happened, you should always be in a position where you are able to land safely.

## Counter-torque oscillation

Certain combinations of take-off weight, thrust from the motor and propeller size can cause pendulum motions. If this happens, the pilot can be pushed to one side during flight because of the counter-torque and the gyroscope effect. The pilot then swings back into his original position because of his weight, only to then swing up even further.

The pilot can do the following to counter the pendulum motion:

- alter the throttle setting
- counter the pendulum effect by pulling slightly on the brakes
- weight-shift in the harness and/or adjust the harness position if it has suitable adjustment options (cross-strap)

Pendulum motions generally occur at high revs and if the propeller has a large diameter. Attempts to steer by the pilot can increase the pendulum motion if they are over-exaggerated and not synchronised. If there are uncontrolled pendulum motions, the pilot should simply reduce speed and not steer at all.

## Cruising

### Level flight

When the brakes are open the Scorpio's flight is level and inherently stable. The brake lines can be used to adjust the speed according to the flight situation, so as to ensure the optimum level of performance and safety.



### WARNING

Braking on both sides with the main brake with the trimmers open (reflex mode) creates an extremely unstable

profile and there is a risk of front stall or other extreme flight manoeuvres.

Braking in accelerated flight is therefore forbidden!

In calm conditions, the best glide speed is achieved on the Scorpio with the brakes fully open. Minimum sink is reached by pulling the brake lines approx. 10cm on both sides. If the brakes are pulled further, the sink does not reduce any more, the control pressures increase noticeably and the pilot reaches minimum speed.

### Turns using main brake

With the Scorpio, Powerplay has developed a glider which reacts immediately to steering input and is extremely responsive.

The Scorpio has very direct and agile handling in turns without any negative tendency which allows very dynamic flight.

The Scorpio is not trimmed for flat turns like a thermalling glider, so it makes no difference whether a turn is flown into or against the counter-torque.

The Scorpio has extremely low negative tendency, so it can also be turned in a tight area by carefully pulling the inside brake line.

If the brakes are applied more, the bank attitude increases and the glider will fly a fast turn increasing in steepness, which will eventually become a spiral dive (further information on this is in the section "Spiral Dive").



### WARNING

Flying too slowly close to stall speed increases the risk of an unintentional asymmetric or full stall. This speed range should therefore be avoided and used only on landing.

## Turns using the wing tip brake

The alternative steering system allows aggressive turns even at full speed without altering the reflex profile.

To steer with the wing tip brakes, use the additional brake handle which is attached to the C-riser by a magnet. This gives you three different types of steering:

1. Steering with the main brakes
2. Steering with the main brakes and wing tip brake
3. Steering with the wing tip brake

Irrespective of the current configuration of the glider and its speed, you can fly turns much tighter and more efficiently by selective use of the brakes. There is less loss of altitude in turns with gentle use of the outside brake at the same time as pronounced use of the inside brake.

It takes some time to get accustomed to how to use the various brakes. However, as you get more experienced, the techniques then offer you much greater potential for flying turns efficiently and perfectly in tune with the motor and trimmer adjustment.

If you do not use the wing tip brake, it can also be removed as described in the section "Adjusting the wing tip brake".



### IMPORTANT

The wing tip brake is not held during launch, so it must be secured using the drawstring stopper. Pull the main line through the drawstring stopper to the end of the wing tip brake handle. This prevents the wing tip brake handle from being caught in the propeller if it accidentally comes loose during launch.

## Using the torque compensator

Engine torque always causes turning during flight in paramotoring. The Scorpio has a torque compensator so that it is not necessary to counter-steer constantly. On both sides of the risers on the upper part of the B-riser, there is a catch, through which an additional line passes. You are able to compensate for the torque using a simple prussic knot. Depending on the strength of the torque, the knot can be pushed upwards (if the torque is strong) or downwards (if the torque is weak). To activate the torque compensator, pull the knot through the catch and hook it into the slit in the catch.

## Landing

Bear in mind the following points whenever you are landing, both with the motor running and without the motor running:

- before you launch, have a good look at the landing area / airfield
- before landing, check the wind direction and speed
- practise landing approaches as often as possible so that you become familiar with the Scorpio
- less space is needed to land without the motor running
- The brakes should be applied in a more regulated manner if there is a strong headwind. After you have landed, turn to face the glider if there is a risk of being pulled back by the glider and falling over
- avoid landing out of a steep turn or making a rapid change of direction before landing because of the pendulum effect caused





## WARNING

Always fly with sufficient speed when you are near the ground (well above stall speed) to avoid an unintentional stall.

### Landing with stationary propeller

Landing with stationary propeller reduces the risk of damaging the propeller and lines during landing. However, you then do not have the option of making a “touch-and-go” if the landing approach is bad or correcting the approach.

For a landing with stationary propeller, switch off the motor 30-50m above the ground. The Scorpio's angle of attack reduces because there is no thrust from the motor, and the glider picks up speed noticeably. The sink rate also increases so that the landing approach initially begins very quickly and with increased sink. In the lower brake range, the Scorpio then begins to convert the energy and flares noticeably. Landing with the Scorpio therefore has much higher dynamics than with a conventional paraglider.

### Landing with motor running

Prepare for a landing with the motor running by making a straight final approach into the wind and allow the Scorpio to level out with the motor running. One meter above the ground, pull down the brakes as far as they will go, so that the glider is fully braked shortly before touching the ground. Switch off the motor immediately after touching down.

### Further tips on paramotoring

Please observe the following points when flying with the Scorpio:

- never start the motor downwind from the glider
- check the seals on all fuel lines
- check whether you have enough fuel for the flight you have planned
- check your personal equipment and harness for any loose parts which could get caught in the propeller
- go carefully through each of the points in the pre-flight check before every flight
- turn off the motor as soon as you have landed, to avoid line and propeller damage
- avoid flying over water and electricity lines, never fly between trees and in general avoid areas which have no landing options if the motor fails
- if the noise of the motor changes or if there is increased vibration, you should land immediately and attend to the problem
- bear in mind that the noise of a motor can be annoying, and avoid making flights low over residential areas

### Rapid descent methods

Many flying situations call for a very rapid descent to avoid a dangerous situation, e.g. the upcurrent from a cumulus cloud, an approaching cold front or a storm front.

Rapid descent methods should all be practised in calm conditions and at sufficient altitude so that a pilot is then able to employ them effectively if extreme conditions arise.

### Spiral dives

The spiral dive is the most effective method for making a rapid descent, and can allow

sink rates of up to 20 m/s to be reached. It is suitable where there is a high ascent rate and little wind.

The certification tests differentiate between sink rates over and under 14 m/s. The Scorpio automatically recovers from the spiral dive within one turn up to 14 m/s. Above 14 m/s, it may be necessary to break the outside half of the wing and/or weight-shift to the outside to recover from the spiral. (With a sink rate up to 20 m/s, the spiral does not tighten automatically). The certification test flights are carried out with a carabiner distance (centre to centre) of 42cm.



## WARNING

In the spiral dive, very high turn speeds can be reached with an increase in acceleration due to gravity (up to over 6g), so exercise care when attempting this manoeuvre. Take note of the following:

- do not continue the spiral dive for too long: it could cause a loss of consciousness.
- always maintain ground clearance of 150 – 200m.

Spiral dives with “big ears” lead to extreme loading of the open section of the canopy. This move is prohibited in Germany.

### Starting the manoeuvre

Begin the spiral dive whilst flying at full speed by flying a turn which becomes tighter and tighter and by using weight-shifting to the inside (refer here to the section “Turns” also).

The bank angle and sink rate are controlled by carefully applying or releasing the inside brake.

Look down before and during the spiral dive to maintain a constant check on your distance from the ground.



## TIP

The outer wing tip may collapse during the spiral dive although this is no cause for concern. It can be avoided by lightly braking on the outside. Release the brakes carefully.

## Recovery

Recover from the spiral dive slowly and steadily over several turns. The inside brakes are gradually released. If the brakes are released too quickly, the increased speed can cause the wing to climb, become unsettled or partly collapse.

Recovery can be assisted by braking lightly on the outside.



### **WARNING**

At a high sink rate (above 14 m/s) it may be necessary to brake the outside half of the wing and/or to use weight-shifting to recover from the spiral.

You must immediately deploy your reserve if you lose control of the glider and the sink rate and find yourself in a stable spiral.

The spiral may lead to loads and/or disturbance to consciousness which prevent later deployment of your reserve.

Spiral dives with "big ears" lead to extreme loading of the open section of the canopy. This move is prohibited in Germany.

## **B-stall**

The design of the Scorpio means that the B-stall is not possible.

## **Big Ears**

Big ears is the simplest method for rapid descent and has a sink rate of 3-5m/s. The advantage of big ears is that the glider continues to fly straight, meaning that a danger area can be avoided. It is even possible to land using big ears, for example on a top-landing to compensate for the updraft.

The wing-loading increases by the reduction in the wing's surface area, the wing becomes more stable against collapses in turbulence. Nevertheless, the air resistance of the wing also increases, and it flies more slowly and closer to the stall limit. To counter this and to increase the effectiveness of the sink, the speed bar is generally also used in combination with big ears.

## Starting the manoeuvre

Start the manoeuvre by pulling both outer A-lines downwards. The brake lines are held steady and the pilot uses weight-shifting to steer the paraglider. You can now descend safely on the stable middle part of the wing. The brakes must not be shortened during the manoeuvre, e.g. by wrapping the brake lines.

## Recovery

Let go of both A-risers smoothly. Assist the opening process by pumping the brakes if the ears do not open automatically.



### **WARNING**

Never use big ears with strong motor thrust. The resistance of the glider canopy increases the angle of attack and the glider may go into a deep stall.

The technique of big ears causes a higher load for the line groups which are still weight-bearing. Therefore, do not fly any extreme manoeuvres with big ears.

This manoeuvre should be avoided in low temperatures. Pilots should be aware that this increases the tendency to deep stall.

## 06 Types of use

The Scorpio was developed and tested for use solely as a paramotor wing. Any use other than as intended is prohibited.

### Hill launches

The Scorpio was not developed or tested for hill launch.

### Winch launch

The Scorpio was not developed or tested for winch launch.

### Tandem/solo use

Tandem or solo use is determined according to the test of paramotor/wing combination.

### Aerobatics

In Germany, it is prohibited to perform aerobatics using a paraglider, which under German law is included in the term “aerial sports equipment” - *Luftsportgerät*.

Aerobatics is defined as flight manoeuvres at an angle greater than 135° along the longitudinal (roll) axis or lateral (pitch) axis.

The Scorpio was not developed or tested for aerobatic use.



### WARNING

Any type of acrobatic manoeuvre at all on the Scorpio is contrary to law and illegal. This would put the pilot's life at risk. Aerobatics involves a risk of unpredictable flight attitudes, which could lead to material damage and structural failure.

## 07 Dangerous situations and extreme flying

### Dangerous situations



#### WARNING

The glider design is such that the following flight manoeuvres cannot be performed in terms of the certification test report:

- asymmetric collapse with open trimmers
- asymmetric collapse with open trimmers and speed bar
- front stall with open trimmers
- front stall with open trimmers and speed bar

Pilot error, extreme wind conditions or turbulence which the pilot does not notice quickly enough may put the wing in an unusual flying position, requiring special reaction and skills on the part of the pilot.

Ground-training is a safe and effective way to familiarise yourself with your glider's reactions. Launch can be practised, as can small flying manoeuvres, such as stall, asymmetric collapse, front stall etc.

A pilot who flies in turbulent conditions or who makes an error in handling the glider is at risk of getting into an extreme situation. All of the extreme flight figures and flight attitudes described here are dangerous if they are carried out with inadequate knowledge, without the right safety altitude or without training.



#### WARNING

Always keep within the recommended operating limits. Do not perform aerobatics and avoid extreme loading such as spirals with big ears. This will prevent accidents and avoid over-loading the glider.

In turbulent conditions, always keep enough distance from rock faces and other obstacles. Time and sufficient altitude are needed to recover from extreme situations.

Deploy your reserve if the corrective manoeuvres described in the following sections do not return the glider to a controllable flying position or if there is not enough altitude for correction.

### Safety training

Taking part in safety training is generally recommended so that you can familiarise yourself with your glider and the correct reactions in extreme situations.

However, the fact that reflex profiles have high stability also entails risks. Asymmetric collapses and front stall require a high level of dynamic force application. If this is too tentative and without enough force, then the glider will be pre-accelerated with marked tuck. This can lead to uncontrolled flight positions.

Special folding lines are not required for carrying out the individual manoeuvres.

However, safety training also subjects your equipment to extreme loads.

## Material stress and damage

Powerplay advises against subjecting the materials of the Scorpio to excessive stress during a safety training (SIV) course.

Uncontrolled flight positions can occur during safety training, which are outside the manufacturer's limits for the paraglider and which can put the glider under excessive stress.

Trimming the line lengths and canopy material after safety training can lead to a general deterioration in flight characteristics.

Damage as a result of safety training is not covered by the warranty.

## Collapsing the paraglider

### Asymmetric collapse



#### WARNING

The glider design is such that the following flight manoeuvres cannot be performed in terms of the certification test report:

- asymmetric collapse with open trimmers
- asymmetric collapse with open trimmers and speed bar

Asymmetric collapses are caused by the stagnation point moving to the trailing edge of the glider. A negative angle of attack makes part of the canopy collapse and tuck under, and the glider may plunge down, turn away or spin.

### Recovery

Should an asymmetric collapse occur, counter-brake slightly on the side of the glider that is still inflated to stop it turning away and to stabilise it, until the glider flies straight ahead again. With large asymmetric collapses, it is important to counter-steer carefully so that the glider does not stall completely, with the collapse then going into a full stall. If you experience an asymmetric collapse, first control the direction and, if necessary, fly away from the hillside.

If you are not able to stop the glider turning, without causing the inflated side to stall, allow the glider to turn slightly while you open the collapse.

Counter-steering and weight-shifting are generally enough to re-inflate the collapsed part of the glider.

If the collapsed part does not open automatically or does not open completely, reinflation can be assisted by applying light brake pressure on the collapsed side (but not hectic "pumping") while counter-steering on the opposite side. Make use of the full braking distance, but be careful not to stall the glider on one side.



#### WARNING

Counter-steering too strongly on the inflated side of the glider can result in a stall and to further uncontrolled flight manoeuvres (cascade of events).

### Asymmetric collapse with tangling

Following a very large collapse, the wing-tip of the collapsed side may become trapped in the glider lines. Here too counter-braking and weight-shifting must be used to stop the glider from turning away. The trapped end

can generally be opened by a short, fast pull on the brake lines.

If this does not release the trapped side, pull the red stabilo line as far as possible. This will often correct a tangle. Pull the stabilo line further for more serious tangles. Always pay attention to your use of the brakes when doing this and do not allow the glider to stall on the open side.

If the tangle has not come free after several attempts, you still have the option to open it like a deep stall or a full stall. These flight manoeuvres always require adequate altitude and a high level of pilot skill.



## WARNING

Deploy your reserve if the corrective manoeuvres described in the following sections do not return the glider to a controllable flying position or if there is not enough altitude for correction.

### Front stall



## WARNING

The glider design is such that the following flight manoeuvres cannot be performed in terms of the certification test report:

- front stall with open trimmers
- front stall with open trimmers and speed bar

A negative angle of attack can also cause part or all of the leading edge of the glider to collapse.

### Recovery

The Scorpio will normally recover automatically from a front stall, but re-inflation can be assisted by rapid, light symmetrical brake input on both sides. This also prevents the wing tips moving forwards during the front stall.

In the case of extreme front stalls across the entire wing chord, the wing tips may move forward. Stop the glider forming a U-shape by timely and energetic use of the brakes. There is a risk that the wingtips will become tangled if they touch each other.

### Types of stall

When a paraglider flies through the air, a laminar and turbulent boundary layer is created. Extremely dangerous flight configurations can result if the laminar boundary layer is interrupted, with practically the entire airflow along the top surface braking away. This happens in particular when the angle of attack is too great.

There are three different types of stall in paragliding.



## WARNING

Full stall and spin are manoeuvres which can be fatal if recovery is not correct. These manoeuvres should therefore be avoided. However, it is important to learn how to recognise the indications that a glider is about to stall so that you can take immediate action to prevent it.

## Deep stall

Paragliders can go into a deep stall for a variety of reasons: brake lines too short (no slack), old or damaged glider material which therefore has increased level of permeability, altered trim/line length and changes to profile characteristics caused by moisture (e.g. flying in rain). Paragliders have a particular tendency to stall if the wing-loading is too low.

In a deep stall, the airflow from the front reduces and the glider goes into a stable flight attitude without any forward momentum. The paraglider sinks almost vertically at 4-5m/s and there is noticeably less flight noise.

### Recovery

Remain in an upright position and push the A- and B-risers in the direction you are flying, so as to shorten them by 5-10cm.

If you have a speed system, you can also use it to accelerate, so that the glider goes into a normal flying position from the deep stall.

After you have landed, the glider and the length of the lines must be checked.

## Full stall

In a full stall, there is complete or nearly complete disruption to airflow around the wing. It is triggered when the glider's maximum possible angle of attack is exceeded. The most common cause is going below the minimum speed or flying near the minimum speed combined with the effects of turbulence.

In full stall, the paraglider loses its forwards travel, surges backwards and deflates. If the brakes are held down, the canopy comes up over the pilot again. The result is an almost

vertical descent with a sink rate of approx. 8m/s.

### Recovery

Fully release the brakes within 3 seconds (count 21, 22, 23). If the brakes are released too slowly, the paraglider may spin. The spin stops automatically when the brakes are released completely.



## WARNING

If the canopy has gone backwards during the full stall, the brakes must be held down, otherwise the canopy may surge forward and, in an extreme case, end up underneath the pilot. Hold the brakes down until the canopy is above you again.

## Spin

The spin is a stable flight attitude, in which one side of the canopy stalls, while the other side continues to fly forward. The glider turns around the stalled side of the wing.

### Recovery

To recover from the spin, the pilot must quickly release the brakes. The stalled side of the wing will then speed up again. Depending on recovery and the dynamic of the circular motion, one side of the canopy may shoot forwards and suffer an asymmetric collapse.

If the pilot suspects that the glider has unintentionally been put into a spin, the brake which has been pulled down too far must be released immediately.





## WARNING

If the spin does not stop, check whether you have released the brakes fully!

## Emergency steering

If for some reason the brake lines are not working, e.g. if the knot on the brake handle has come undone or a brake line is defective, the Scorpio can also be steered and landed using the rear risers.

In this case, stall happens more quickly and the pilot must compensate for the changed flight behaviour by pulling carefully on the risers.

## Other tips for dangerous situations

### Stalling in rain

In general, there are two reasons why a paraglider may go into deep stall in rain:

1. The first risk lies in the fact that the canopy weight increases if a glider is flown in rain for any length of time. The centre of gravity and angle of attack then shift, which can result in airflow separation/stall. Note here that if a glider absorbs more water (as older gliders do because they lose their water-repellent coating over time) and is closer to the deep stall limit because of its design and age, less water absorption and thus weight increase will put the glider into deep stall.
2. When there is rain, there can be so many water droplets on the top surface of a glider that almost the entire upper surface is affected but, even so, the drops "bead" so the surface is not wet through. This makes the top surface so "rough" in texture from

the drop formation that the airflow over the top of the wing separates from the surface. This phenomenon has been known for some time from hang-gliding and gliding. With new gliders, the droplets are absorbed less quickly by the fabric. Thus, the newer a glider is, the greater the number of droplets caught on the top surface and the bigger those droplets are, the greater the risk that there could be airflow separation. We were able to recreate these conditions by practical tests and computer simulations, but they occur very rarely.

It is the case in both of the above situations that the control travel and braking distance first reduce and then the deep stall is caused, mostly by alteration of the brake travel or angle of attack, e.g. by a gust or thermal.



## WARNING

Flying in extremely humid weather or in rain is outside of the operating limits of the glider. If you are not able to avoid flying in rain, please observe the following:

- it is advisable to fly with slight acceleration during and after the rain (min. 30% or more)
- use no brake input or as little as possible
- do not use big ears
- control travel reduces
- avoid tight turns, especially in the final approach. If conditions allow, you should also fly slightly accelerated in this phase
- avoid large angles of attack and the possible early stall near the ground (release the speed bar only slowly)

## Advertising and adhesives

Always make sure before attaching advertising to the glider that the adhesive planned will not alter the glider's flight behaviour. If you are in doubt, we recommend that you do not attach the adhesive.



### IMPORTANT

Attaching adhesives to the glider which are large, heavy, or made of unsuitable material may result in revocation of the certification.

## Overloading

The glider structure is put under high levels of strain in particular on extreme flight manoeuvres, rapid descent methods (spiral dives) or prohibited aerobatic manoeuvres. They considerably accelerate the aging process of the structure and should therefore be avoided.

The glider must be inspected earlier than is usually the case if it has been put under more than the usual degree of strain.

## 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.

## Temperature range

Temperatures below -10 °C and above +50°C can make the paraglider unfit to fly. The manufacturer's warranty will lapse if the glider is used outside of this temperature range.

## 08 Storing and looking after the paraglider

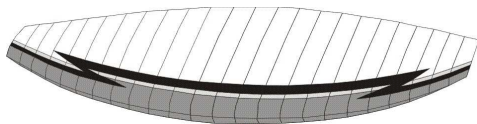
### Storing the paraglider

#### Packing the paraglider

It is very important to pack the glider carefully in order to ensure the longevity of the leading edge reinforcements. Fold up the Scorpio as shown in the diagrams below. The leading edge reinforcements (Mylar and Rigid-System) on the front edge are placed on top of each other to avoid bending or misshaping them. This method of packing ensures that the leading edge is treated carefully, which will increase the glider's life, performance and launch behaviour.

If the reinforcements have been bent or misshapen, they distort more easily during flight, creating an altered air inflow which can lead to a loss in performance and changes in flight behaviour.

The leading edge reinforcements also perform an important function on launch. Therefore, the less they have been bent, the more easily the glider will inflate and launch.

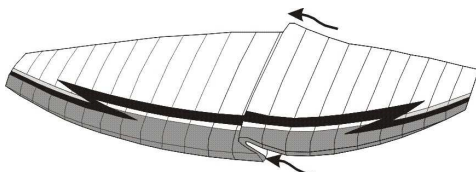


**Fig 6a:** Spread out the paraglider completely on a smooth surface

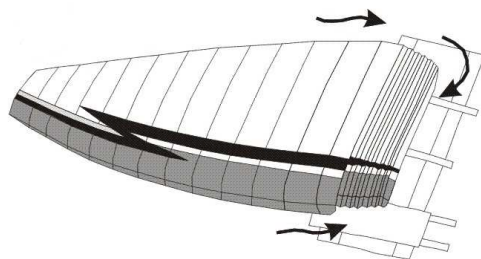


#### IMPORTANT

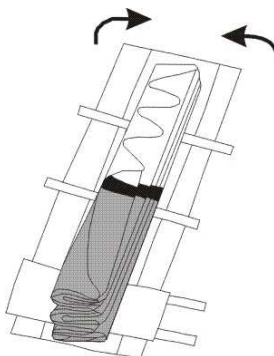
Do not drag the paraglider across any rough surfaces such as gravel or asphalt. This may damage the seams and surface coating.



**Fig 6b:** Next, all the ribs on one side are placed one on top of one another, so that the leading edges are not bent.



**Fig 6c:** Now place the internal protection bag provided underneath the section of glider which has been folded together, and turn it around 90°, so that the ribs are all lying along the length of the protection bag. Then continue as in the second step, placing the leading edges one on top of the next until you reach the tip of the glider.



**Fig 6d:** The glider is now folded up along its length, and the leading edges are on top of each other without having being bent.

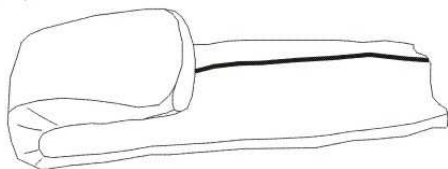
Fasten the Velcro straps near the leading edges, so that they do not slip, and the two straps in the middle and at the end of the glider.



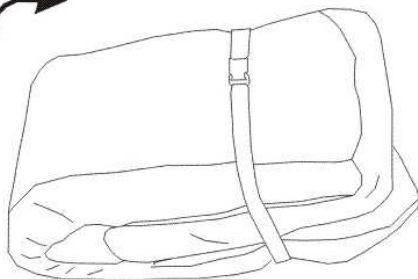
## TIP

Make sure that the leading edge reinforcements lie flat and are not bent or twisted by doing up the Velcro too tightly.

Next, do up the zip, making sure that none of the lines or fabric is caught in the zip.



**Fig 6e:** Fold up the glider along its length, with the first fold below the leading edge reinforcements. Pay particular care not to bend any of the rigid reinforcements!



**Fig 6f:** Fold the glider again. Then place the compression strap around the glider and fasten it by pulling gently. Make sure that the glider is only loosely folded and is not bent or compressed excessively.

## Storing and transporting the glider

Even if your paraglider was completely dry when it was packed up after the final flight of the season, for long-term storage you should if possible take it out of the backpack and spread out the canopy a little in a clean, dry place away from direct light. If you do not have the space to do this, then open the backpack, internal bag and belt as much as possible and avoid compressing it. It must be stored at a temperature between 10° and 25° C and in relative humidity between 50 and 75%. Make sure too that the paraglider is not stored in a place where animals such as mice or cats could use it as a place to sleep.

Do not store the paraglider near any chemicals. Petrol, for example, causes the material to disintegrate and can cause considerable damage to your paraglider. When your equipment is in the car boot, keep it as far away as possible from any spare petrol cans or oil containers.

The Scorpio should not be exposed to extreme heat (e.g. in the boot of the car during summer). The heat may cause any moisture present to be pressed through the fabric, thereby damaging the coating. High temperatures accelerate the process of hydrolysis, particularly when combined with moisture, which damages fibres and coating. Do not store your paraglider near radiators or other heat sources.

Always transport your glider in the special inner bag and use the backpack provided for the rest of the equipment.

## Looking after the paraglider

### Fabric

Powerplay uses a specially developed polyamide fabric for the Scorpio which has a high-quality coating for improved UV resistance, colour fastness and air permeability. This fabric undergoes rigorous laboratory tests and was tested for several months under extreme conditions and heavy use in flight.

Care is essential to ensure that the fabric and glider remain durable and retain their qualities. The glider should therefore be protected from unnecessary UV light. Do not unpack your glider until immediately before flight and pack it up straight after landing. Modern paraglider fabrics have better protection against the sun, but UV rays in particular are still one of the decisive factors in how the fabric ages. The colours will fade first and then the coating and fibres will begin to age.

When the Scorpio is manufactured, the side of the fabric with the coating is kept to the inside. This provides relatively good protection from damage for the coating which is of key importance to the fabric's features. When choosing a place to launch, try to find somewhere which is smooth and free of stones and sharp objects.

Do not stand on the glider. This weakens the fabric, especially if it is on a hard or stony surface. Pay attention to the behaviour of spectators at the launch site, especially children: do not hesitate to draw their attention to the sensitive nature of the fabric.

When you are packing up your glider, make sure that there are no insects trapped inside. Many insects produce acids when they decompose, which can cause holes in the fabric. Grasshoppers make holes by biting through the fabric and also excrete a

dark liquid which stains. Keep animals away when you are packing up. Insects are not attracted by any particular colours, contrary to what is commonly believed.

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 paraglider unsuitable for flying within a short time.

A brand-new glider will often be compressed when delivered. This is solely for the initial delivery and the glider should not be compressed in such a way again. Do not pack your glider too tightly after use and, even though it is very comfortable, never sit on the backpack with the glider inside.

If salt water gets on the glider, it should be rinsed immediately in fresh water (refer to the section "Cleaning").

### Lines

The Scorpio has various different high-quality and accurately manufactured lines which have been selected according to the load and area of use. You should also protect the lines from unnecessary UV light because, as with the fabric, UV light in particular will weaken the lines.



### IMPORTANT

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.

Be careful that there is no abrasion caused to the coating on the lines by rubbing, particularly when ground-training with crossed risers.

Do not walk on the lines after the glider has been spread out and watch out for spectators or skiers who may inadvertently go over the lines.

When you are packing up the glider, be careful to avoid putting any unnecessary kinks in the lines and use only the overhand knot or bowline knots described for the brake lines.

## Cleaning

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.



### IMPORTANT

Do not under any circumstances 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.

## 09 Repairs, Inspections and Warranty

### Type designation

Powerplay paragliders have an exact identification on the underside of the stabilo lines or on the centre rib, which is an obligatory requirement for all paragliders. The information required is set out in the airworthiness requirements.

It is helpful to provide the type designation and serial number of the paraglider if you are contacting your Powerplay dealer with any queries or ordering replacement parts or accessories, to ensure accurate identification.

### Repairs

#### Powerplay workshops

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

#### 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. Replacement lines for the Scorpio can be ordered direct from us online at:

[www.powerplay-gliders.de](http://www.powerplay-gliders.de) → Service → Line service

### 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

Measuring the length of the lines is part of the regular paraglider inspection. The lines must be measured with a load of 5kg, so as to ensure reproducible results for a comparison with the lengths given in the check sheets. The line lengths for the Scorpio are listed in the Maintenance and Service book.

The lines have a considerable influence on flight behaviour. Correct line length and symmetry are also important for performance and handling. Powerplay therefore recommends an inspection every 50 to 100 hours airtime or once a year.

Lines age and lose strength even if the paraglider is used infrequently or not at all. This can affect the safety and operation of your paraglider. Signs of wear are slight bumps or changes in flying characteristics. The lines must then be replaced immediately. Use only inspected and approved lines, which can be obtained through Powerplay.



#### WARNING

A damaged line can result in loss of control of the glider, so lines which are damaged must always be replaced.

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

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.

## Inspection

### General

Powerplay's service programme as set out in the Maintenance and Service book should be followed so that the same high level of flight safety, operational safety and reliability is ensured for your glider in the future as well.



### IMPORTANT

Read the Maintenance and Service book and observe the terms therein to ensure the validity of Powerplay's warranty, the glider's certification and insurance cover.

Failure to observe the inspection periods shall render invalid the certification and warranty. A properly completed logbook with details of all flying and training will help you to comply with these periods.

There is additional information on inspections in two separate booklets, both of which form part of this Manual:

1. Inspection information (required only in Germany and Austria), and
2. Maintenance and Service book (one booklet for each size and model).

These can be downloaded from the website:

[www.powerplay-gliders.de](http://www.powerplay-gliders.de) → Products → Scorpio

### Inspection periods

In Germany, Powerplay gliders must be inspected as follows (check the situation in your country):

- Gliders used by schools and tandem gliders (if used commercially) must be inspected every 12 months from the purchase date (the same inspection as the 2-yearly check).
- Gliders for personal use and tandem gliders (not used commercially) must be inspected every two years from the purchase date.
- The glider must be inspected after 100 hours of use (including ground handling) if this occurs prior to the period given in A) and B) above.
- Ground handling time must be at least doubled when calculating the total hours of use because of the increased wear and tear on the glider.

### Validity of inspection

It is very important that your glider is serviced at the required intervals throughout its entire life. In order to benefit from Powerplay's warranty:

you must have your paraglider inspected by Powerplay or an inspection agent authorised by Powerplay, 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.

### Inspection by the pilot

Under § 14 para. 5 of the German Ordinance on Aircraft and Aeronautical



Products (LuftGerPV), pilots in Germany are able to carry out the inspections themselves or appoint a third party to do so (e.g. manufacturer/importer), provided that the requirements are all fulfilled. However, if this is done, the liability and warranty of Swing Flugsportgeräte GmbH will lapse.

The type-testing bodies recommend that inspection is carried out by the manufacturer/importer or by an authorised inspection agent.

## Warranty

Powerplay's warranty is a comprehensive service package, which fulfils high standards for customer service and customer care. The terms of the warranty are in the enclosed warranty card. You must register your paraglider or other Powerplay product in order to be able to rely on the warranty. You can either complete the warranty card and post it to Powerplay or register quickly and easily online. Go to the Powerplay website:

[www.powerplay-gliders.de](http://www.powerplay-gliders.de) → Service → Online warranty

Complete the registration within 14 days after purchasing the paraglider. If this is done online, you will receive a confirmation email. If you do not have an email address, enter 'info@powerplay.de' in the mandatory field. Registrations by post or without a personal email address will be recorded by Powerplay but will not receive confirmation. We therefore recommend that you register online with an email address.

The manufacturer must be notified immediately of any defects in the product, variations or changes in flight behaviour and any warranty claims. If necessary, the glider or other Powerplay product must be sent to Powerplay for inspection.

Powerplay generally adds all email addresses provided in warranty cards to its

distribution list. If you only wish to register for the warranty and do not wish to receive any further safety and information email messages, please do not give your email address on the warranty card.

## 10 Powerplay on the World Wide Web

### Powerplay website

Powerplay has a comprehensive website, which provides additional information about the Scorpio and many other issues related to powered paragliding:

**[www.powerplay-gliders.de](http://www.powerplay-gliders.de)**

An extensive range of accessories for your glider and useful products for pilots are available at

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

You will also find links there to other services and websites:

- Product registration
- Swing's Online Shop
- Facebook, Twitter & youtube

These websites and their content are provided for your use. The content of the Powerplay and Swing websites has been made available for your use on an "as is" and "as available" basis. Powerplay/Swing reserve the right to alter the websites at any time or to block access to them.

### Product registration

Registration of Powerplay gliders is easy and gives you many benefits. In addition to important safety notices, you will receive advance information about, e.g. new products, upgrades, events and special offers.

Registration is a prerequisite for a valid warranty (refer here also to the section "Warranty"). In addition, any safety notices and information for the registered product are sent immediately to the email address submitted. Your email address will not be provided to any third parties.

### Powerplay-Online Shop



The Powerplay Online Shop is part of the Swing Online Shop, where you are able to obtain directly from Swing the full range of paraglider accessories, clothing and accessories and reserves.

It is easy to place an online order and payment is made by credit card or Paypal.

### 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.

# 11 Appendix

## Addresses

### Powerplay

An der Leiten 4  
82290 Landsberied  
Germany  
Tel.: +49 (0) 8141 3277 - 888  
Fax: +49 (0) 8141 3277 - 870  
Email: info@powerplay.de  
www.powerplay-gliders.de

### Paragliders recycling

SWING  
- Recycling Service -  
An der Leiten 4  
82290 Landsberied  
Germany

### DHV

Miesbacher Str. 2  
Postfach 88  
83701 Gmund am Tegernsee  
Germany  
Tel.: +49 (0) 8022 9675 - 0  
Fax: +49 (0) 8022 9675 - 99  
Email: dhv@dhv.de  
www.dhv.de

## EAPR

European Academy of Parachute Rigging  
Marktstr. 11  
87730 Bad Grönenbach  
Germany  
Tel.: +49 (0) 8334 - 534470  
Fax: +49 (0) 8334 - 534469  
Email: info@para-academy.eu  
www.para-academy.eu

## DULV

Mühlweg 9  
71577 Großerlach-Morbach  
Germany  
Tel.: +49 (0) 7192 93014 - 0  
Email: info@dulv.de  
www.dulv.de

## Versions

### Version 1.1

Date: 16.07.2012  
First version of the Instruction Manual

### Notes:

[illegible]

## Powerplay

An der Leiten 4

82290 Landsberied

Germany