ADVANCE EPSILON 7

User manual
Edition 1 / 03_2013

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Contents

Thank you for flying ADVANCE

Our sincere thanks to you for deciding on an EPSILON 7 - another ADVANCE quality product. We hope that you will enjoy many rewarding hours in the air with it.

This Operating Manual is an important companion to the paraglider. In it there are instructions and important information about safety, care and maintenance. We therefore recommend that you carefully read through the manual before your first flight.

On www.advance.ch you will find the latest version of this manual and more information. Any new safety-related knowledge about the product will be published here on the website. Please contact your dealer or ADVANCE direct if you have any questions or problems.

Now we wish you a lot of fun with your EPSILON 7 and, as always, “happy landings”.

Team ADVANCE

About ADVANCE

ADVANCE is a worldwide leading paraglider manufacturer based in Switzerland. Since its founding in 1988 the company has continued to follow its own policies and ideas in both development and production. The result is fully-finished products with distinctive characteristics.

The team of experts behind the ADVANCE brand share both the passion for and confidence in their ADVANCE products. At home in the air themselves, they bring valuable personal experience and dedication to the workplace.

Thorough checking of the production process and supervision of the working practices in ADVANCE's own factory in Vietnam guarantee high quality work. A long-standing relationship with cloth and line manufacturers means that ADVANCE know-how finds its way directly into the development of new materials.

ADVANCE place great importance on after-sales service, and have a well-developed worldwide service network. A continuous exchange of experience with customers keeps new knowledge flowing in, which has an influence on ADVANCE products – and so the "Circle of Service" is completed.

The EPSILON 7

Complete pleasure

This is what happens when a combination of apparent opposites leads to a successful outcome. The new EPSILON 7 leisure intermediate captures the attention by its compactness, combined with outstanding performance. Exceptionally straightforward and precise handling makes this elegant wing the perfect glider for recreational thermaling pilots.

Outstanding features

Compact, but great performance

The EPSILON 7 looks compact, but doesn't pay for it in performance – quite the opposite: it's the latest technology that gives the EPSILON 7 enormous performing possibilities. A new line concept with 3 risers but only 2 storeys above, resulting in many fewer lines and suspension points, accounts for this huge performance upgrade.

Precise and direct handling

Very precise and direct EPSILON 7 handling is a delight. This results from a completely fresh investigation of the relationship between wingspan and line length – and a new generation profile. Also, a new look at brake line set-up helped out with the direct and precise handling; and there's less canopy inertia.

A definite 'Feeling Good and Having Fun' factor

The EPSILON 7 is a fully-finished, widely capable recreational intermediate; easy to manage in turbulence and extreme situations, with high passive safety. The new profile geometry gives the EPSILON 7 distinctive pitch stability, and this keeps the pilot feeling comfortable and happy, all the time – especially in turbulent air.

Compact

Precise

Predictable

Other important details

ADVANCE Standards

ADVANCE pays a lot of attention to small details. Sewn-in tension straps improve the wing's stability, and the distinctive winglets reduce induced drag (vortex-effect). Velcro closures at the wingtips make it easy to remove debris like sand and snow from the glider. The EPSILON 7 is made from high quality fabrics, and the ball bearings in the speed system pulleys ensure minimal rolling resistance. Like all ADVANCE models the EPSILON 7 has swivels on the brake lines and different sized brake handles depending on the glider size, with stowing magnets.

Pilot requirements

The EPSILON 7 is best suited to the typical intermediate leisure pilot who regularly flies in thermal conditions. He will already have a competent, active flying style, can recognise an approaching collapse, and knows how to prevent it without overreacting. From this starting point thermaling with the EPSILON 7 will mean perfect pleasure. Thanks to its large degree of safety the EPSILON 7 can also be flown by the talented, advanced student.

General advice about paragliding

Flying a paraglider calls for appropriate training and a sound knowledge of the subject, as well as, of course, the necessary insurance cover and licence. A pilot must be able to correctly assess the weather conditions before taking off. His or her capabilities must be adequate for the paraglider used.

Wearing an adequate helmet, suitable boots and clothing, and the carrying of an emergency parachute are essential. Before every flight all items of equipment should be checked for damage and airworthiness. A proper pre-takeoff check must also be carried out.

Every pilot bears sole responsibility for their participation in the sport of paragliding. Neither the manufacturer nor the seller of a paraglider can guarantee or be held responsible for the pilot's safety.

Using the paraglider

Delivery

Every ADVANCE paraglider has to be flown by the dealer before delivery to check for correct settings and trim. The dealer finally enters the date of the first flight on the type placard fastened on a rib at the centre of the wing. This entry together with your completed warranty form ensures that deficiencies in the product, due the manufacturer, are covered by the ADVANCE warranty. See 'Warranty' in the "Service" section.

EPSILON 7 delivery includes a COMFORTPACK 2 rucksack, an inner bag, a compression strap, a repair kit, speed lines with speedbar, a mini-windsock in the glider colours and a «Getting Started» booklet.

Basic settings

At delivery the basic set up of the EPSILON 7 will be the original trim situation that the ADVANCE test team found to be best. Certification was also gained in this condition. Any alterations or changes to the paraglider, such as altering the line lengths or fitting different risers or quicklinks, will result in a loss of the glider's certification. See section "Certification".

Adjusting the brake lines

The length of the brake lines has been set at the factory so that, with hands fully up, the trailing edge remains unbraked in accelerated flight – (no crease in the wing). Basically, this setting should be kept.

If the brake line length does have to be reset there should be 8 cm of initial free brake line movement between the brakes fully released position in unaccelerated flight, and that point where the lines first affect the trailing edge. We recommend a bowline knot for attaching the handles. See illustration in the appendix.

Speed system with SPI

The EPSILON 7 has a speed system with a Speed-Performance-Indicator (SPI), which reads off against 3 positions on the backs of the risers. The red markers on the speed system enable a precise speed bar position to be set to suit the in-flight situation.

Best gliding to the next thermal needs an on-going choice of speed to fly, depending on the current values of headwind, expected next climb rate , and the rate of sink.

Example
EPSILON 7/26

Neutral position

Position 30%

Position 80%

Thanks to its high stability the EPSILON 7 can be flown in accelerated condition in light turbulence without problem. The choice of accelerated speed for best glide does play an important role for a relatively high performance intermediate glider.

Each of the EPSILON 7 SPI positions has an icon with a value for headwind, expected climb and sink rate. These indicated positions are effective for only one of their three values, taken in isolation – considered by itself. This means that either the headwind, or the expected rate of climb, or the sink rate applies to that position. The SPI principle is based on the simple (using headwind and sink) and the extended (including expected climb rate) McReady Speed-To-Fly theory.

SPI values

The following table gives typical values for the two EPSILON 7 SPI accelerate positions.

- With no headwind (or with a tailwind), little or no expected thermal, and the glider's normal sink rate (ca.1.2 m/s vario) you should fly without speed bar application (0%).

- With a headwind of 10 km/h, or an expected next climb (vario) of 0.4 (+/- 0.1) m/s, or a sink rate (vario) of 1.4 (+/- 0.1) m/s set the 30% position. If two or more of these values apply at the same time you can already use the 80% position.

- With a headwind of 20 km/h or an expected climb rate (vario) of 1.3 (+/- 0.1) m/s or a vario sink rate of 2.3 (+/- 0.1) m/s choose the 80% position.

EPSILON 7	
30% Position	
Headwind in km/h	10
Expected climb in m/s (Vario value)	0.4 (+/- 0.1) *
Sink rate in m/s (Vario sink)	1.4 (+/- 0.1) *
80% Position	
Headwind in km/h	20
Expected climb in m/s (Vario value)	1.3 (+/- 0.1) *
Sink rate in m/s (Vario sink)	2.3 (+/- 0.1) *

* varying with glider size and in-flight weight

Caution: Even though the EPSILON 7 has a high degree of stability in accelerated flight you should only use as much speedbar as you feel comfortable with.

Info: According to the table for best glide you should fly to an expected 0.4 m/s climb with 30% accelerate, and to a 1.3 m/s climb with 80%. This only applies if you can actually get all the way to the next thermal in the accelerated condition.

Info: Although flying into a headwind (15-20 km/h) gives you the feeling that your gliding performance is being badly affected, bear in mind that strong sink (more than 2m/s) has a relatively stronger adverse affect.

Setting up the speed system

The EPSILON 7 speed system can, with the help of the SPI, be adjusted so that the whole speed system travel can be used. The system is correctly set when pushing the first speed step gives you the 30% position, and pushing the second achieves 80% accelerate. Both toes fully extended should then reach 100% (pulleys touching).

If, by setting the speed bar line lengths, a first adjustment of the speed system for leg length and harness does not result in the set-up described above, fine adjustment is possible by changing the 2 stage settings on the risers. By moving the knots which locate the gearchange balls ① (see illustration page 13) the speed system travel and loading can be adjusted.

Example: If the knots are moved downwards the changeover from the 3:1 ratio to 2:1 occurs earlier, raising the loading but shortening the total travel. Conversely, moving the knots upwards delays the gear change, and lengthens the total travel of the speed bar.

The EPSILON 7 speed system is arranged so that the profile shape of the wing is fully retained over the angle-of-attack range of the speed system. This maintains the beneficial qualities of the profile at high speeds.

Caution: The speed system is correctly adjusted when you can use the full travel available on the risers. Make certain that the speed lines are not set too short, thus causing the wing to be pre-accelerated all the time.

Suitable harnesses

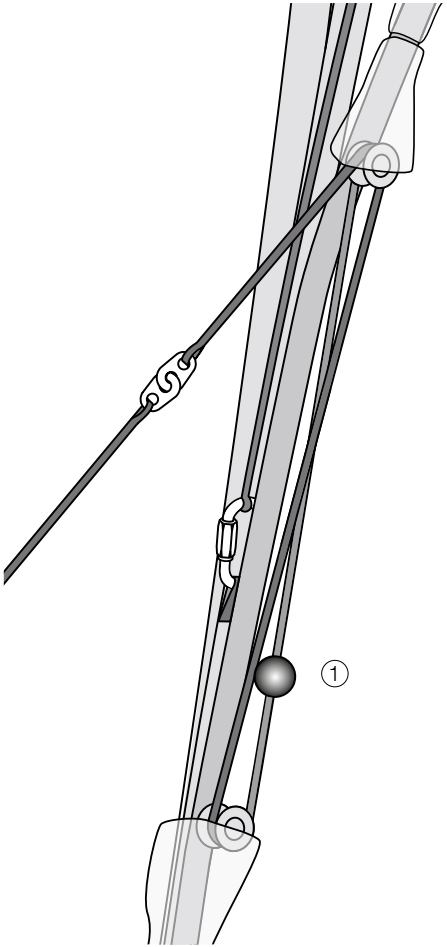
Basically the EPSILON 7 can be flown with any harness that does not have rigid cross bracing (see section “Certification”).

The chosen harness should ideally have a carabiner distance of ca. 45 cm and a support height of between 40 and 48 cm.

Info: Experience has proved the theory – a streamlined harness can significantly improve gliding performance.

Weight range

The weight ranges of the different sizes are given in the section «Technical data». The figures given there represent the total in-flight weights. This includes the pilot’s body weight, plus clothes, as well as the weight of all the equipment (glider, reserve, harness, instruments etc.).

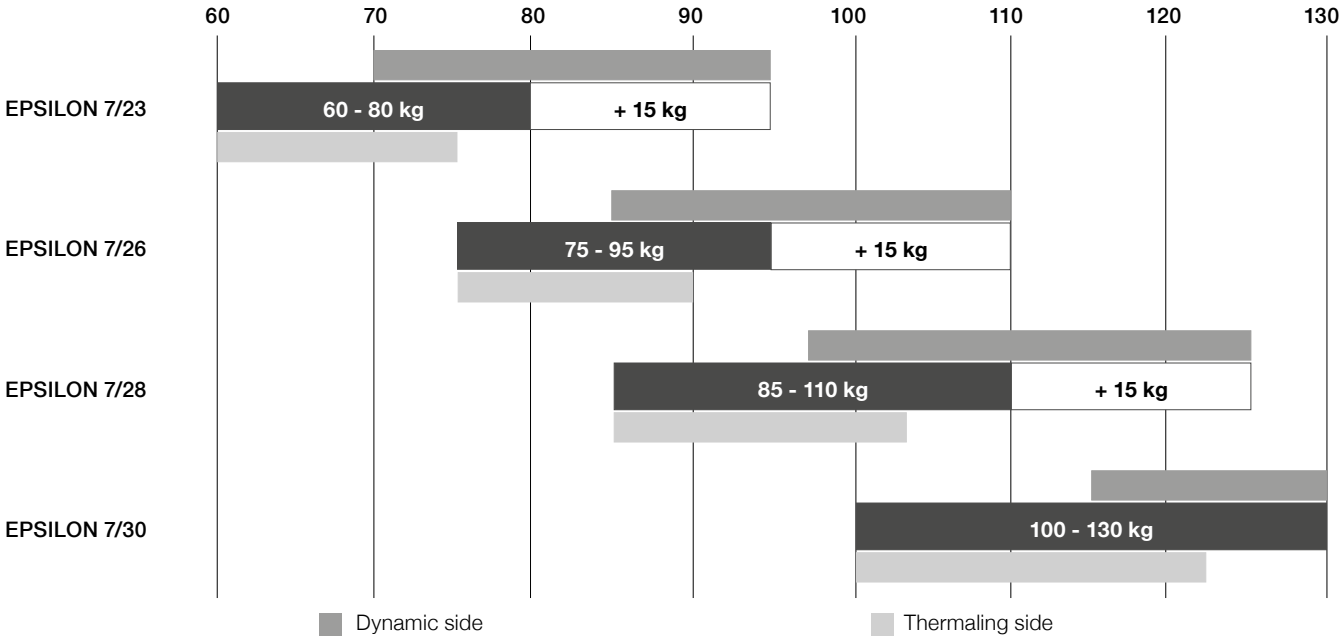


Flying at the lower or upper weight limits can have an effect on the paraglider's flying characteristics and handling, but without influencing the pilot's safety. Glide performance remains the same over the whole weight range, but climbing performance will be altered. When the EPSILON 7 is flown in its upper weight area, the higher wing loading produces a higher trim speed, and a more dynamic and agile flying character.

Tip: ADVANCE recommend that the EPSILON 7 is flown in the middle to the upper part of its recommended weight range.

Note: The EPSILON 7 has a weight range that has been extended above the recommended region, but so that it still keeps its EN/LTF B classification; the upper limit of the EN/LTF B classification lies around 15 kg above the standard weight range for the size 23, 26 and 28.
When the EPSILON 7 is flown in its upper weight region, the higher wingloading produces a higher trim speed, and a more dynamic and agile flying character. The fact that the EPSILON 7 keeps its EN/LTF B rating at the higher wing loadings confirms its high degree of passive safety.

Weight range



Flight characteristics

We recommend that you make your first flights with your new glider in quiet conditions, in a familiar flying area. A few pull-ups at an easy site will give you confidence in the EPSILON 7's handling qualities, from the very beginning.

Takeoff

Before every takeoff carry out the following pre-takeoff checks:
1. Harness and helmet done up, reserve OK?
2. Lines free?
3. Canopy open?
4. Wind direction and strength assessed?
5. Airspace and field-of-view clear?

The EPSILON 7 takeoff behaviour is very smooth and easy for both forward and reverse takeoffs. The canopy inflates quickly and rises progressively, without hanging back or shooting in front.

Because the EPSILON 7 rises very easily it is very important to match the pull-up impulse to the conditions. This means:
- In a lot of wind and/or on a steep slope the EPSILON 7 needs little or almost no pull-up impulse.
- In calm conditions and/or flat land a relaxed pull-up makes sense.

The EPSILON 7 has split A risers. We recommend that you use all the A risers for takeoff. The EPSILON 7 inflates reliably from the middle out, and rises very straight with little exertion.

> Tip: Before takeoff get your canopy into the right shape. Do this while sorting the lines, by pulling the brake lines in until you have the perfect curved shape.
>
> Info: You can also use the inner A lines for an EPSILON 7 takeoff, but handling is easier using all the A risers.

Takeoff in light wind (forward takeoff)

The EPSILON 7 only needs a moderate pull-up impulse even in a light wind. It is not necessary to step back and 'run' into the lines. Guide the glider up with pronounced leaning forward, but without too much of a pull on the A-risers, until the canopy is overhead. During the pull-up phase any correcting should only be done by decisive going-under-the-wing, without using the brakes. After any necessary correcting and a satisfactory visual check a few determined steps with good leaning forward will achieve lift off, even in little wind.

Info: An EPSILON 7 takeoff is exceptionally easy to do. Match your efforts (as described in the section ”Takeoff“) to the wind conditions and takeoff slope.

Takeoff in stronger wind (reverse takeoff)

The reverse takeoff is mainly recommended for stronger winds. During the pull-up you should walk towards the EPSILON 7as necessary. Turning round and taking off with the EPSILON 7 will then prove to be easy.

Tip: Playing with the glider on flat ground in some wind gives a good feeling for the wing. You can get to know the EPSILON 7’s characteristics very well, and try out takeoffs, stalling, shooting forward tendency and collapses – while remaining safely on the ground. The ADVANCE test team have a motto: one hour ground training is worth 10 high flights. N.B: Ground handling practice can increase wear on your glider.

Info: The EPSILON 7 is very easy to take off. Just as for the forward takeoff you should also suit your pull-up impulse to the wind and slope when making a reverse pull-up (as described in section”Takeoff“).

Normal flight

In calm air the EPSILON 7 best glide is achieved with fully released brakes. Light braking brings the glider to its minimum sink condition. When flying into a headwind, through descending air, or when proceeding to the next thermal, glide performance will be distinctly improved by appropriate use of the speed system. The SPI helps you do this. See section «Speed-Performance-Indicator (SPI)».

Despite the wing’s high stability an active flying style is recommended – collapses can be almost completely avoided. This means keeping the lightly-braked glider directly above you, in other words, countering roll and pitch disturbances.

- When the angle of attack increases (flying into a thermal; wing swings back) the brake lines should be temporarily released fully, until the glider returns to its overhead position.

- When the angle of attack reduces (glider dives forwards, pilot swings back) the wing should briefly be braked more.

Be careful not to get below minimum speed, and don’t overreact with the brakes.

Turning flight

The EPSILON 7 has precise response to brake application. It reacts directly and progressively to increasing steering demands, once the brake line free travel has been taken up. Steering can be effectively assisted by active weight shift. Angle of bank can always be increased, stabilised or reduced by the appropriate pull on the brake line.

When circling in a thermal choose the desired angle of bank and corresponding turn radius by using the inside brake line, and let the paraglider turn steadily like this. Stabilise the outside wing with outside brake as required and, in particular, keep a check on the rate of turn. Too much brake on the outside wing will slow the turn and the airspeed down, and lose the glider's good steering qualities.

A harness that is matched to the EPSILON 7 flying qualities helps you enter and settle on a very steady turn. See also section «Suitable harnesses».

Caution: To keep good manoeuvrability make sure to fly your EPSILON 7 with enough airspeed while turning in thermals – not too much outside brake.

Tip: If a brake line breaks you can steer the EPSILON 7 using the C risers.

Accelerated flight

The EPSILON 7 wing remains extremely stable even in accelerated flight. However, paragliders operate at a lower angle of attack while flying at their higher speeds, and the degree of stability is generally reduced. The higher aerodynamic forces involved at higher airspeeds mean that a collapse can be more dynamic. See also section «Collapses».

When encountering strong turbulence while flying accelerated you should first release the speedbar completely before applying the brake necessary to stabilise the wing. The high stability of the EPSILON 7 allows light turbulence to be flown through while accelerated. While doing this active accelerating should be used, whereby the angle of attack is accommodated by using the speedbar instead of the brakes. By doing this pitch attitude disturbances will be minimised and good gliding performance maintained. See also section "Speedsystem with SPI".

- If the angle of attack increases (e.g. wing goes back in rising air) the speedbar should be briefly but strongly pushed.

- If the angle of attack reduces (e.g. wing shoots forward) the speedbar should be released.

Caution: Even though the EPSILON 7 is stable in accelerated flight you should only use as much speedbar as you feel happy with.

Tip: Make sure that you do not use speedbar and brake at the same time, otherwise you will get into the worst possible gliding situation, to no advantage.

Tip: For best gliding always choose a speed that takes into account actual headwind, sink rate and expected next climb.

Collapses

Asymmetric collapse of the wing

The EPSILON 7 has a very stiff and stable canopy. With an active flying technique collapses can be almost completely prevented in normal flying conditions.

If the glider does, however, suffer a side collapse at trim speed, it will respond to collapses of 50% or more with a slight to moderate turning tendency (modest turning to the side), allowing heading to be easily held with light counter-steering. Normally, the wing will reopen without pilot action.

Due to higher aerodynamic forces during accelerated flight the glider will respond to a side collapse more impulsively. The turning tendency in fully accelerated flight will be more dynamic, but is still well controllable. Turning away is unspectacular and slow, even after a collapse at full speed.

If a collapse is slow to reopen, a deep but fast pull on the closed side brake will help. It is important to completely release the brake again to let the glider keep its flying speed. Be careful with the brake on the open side, and only apply enough to keep straight – so as not to stall the wing.

Poorly flown wingovers can cause a wingtip to fold inwards from the side, causing it to catch in the lines and create a cravat. Due to the high drag they produce cravats can lead to strong rotation (spiralling). Stop an increase in rotation rate by just the correct amount of outside brake. Then open the cravated wingtip by pulling the orange stabilo line. Clearing a cravat can be also done more quickly by ‘pumping’. The appropriate brake should be applied to 75% brake travel within a maximum of two seconds, and then released immediately.

Symmetric collapse (frontstall)

After a spontaneous or A-riser provoked collapse the airflow breaks away from the profile and the canopy will pitch back. The pilot swings back underneath after a short delay. Wait, without applying brake, until the wing is again above you and returns to normal flight. After a big collapse reopening may be delayed, but do not forceably encourage reopening by the use of excessive brake, because of the risk of a fullstall.

Caution: After a very impulsively provoked front collapse in accelerated configuration (for example during SIV training) it can happen that the front of the canopy does not open by itself. Opening should be encouraged with a brief brake impulse, achieved by pulling the brakes down to 75% within one second, then releasing them immediately.

Rapid descents

For quick and efficient ways of getting down the ADVANCE test team recommend big ears (with or without speed bar) or the spiral dive – the choice depends on the situation.

Tip: Fast descents should be practised now and then in quiet conditions – so they won't become emergencies when you need them.

Symmetrical collapsing of the wingtips (big ears)

The EPSILON 7 has split A-risers, which make it easy to apply big ears.

To enter this manoeuvre pull both outer red marked A lines quickly down together. This will fold the wingtips in, and you can hold them there easily. To reopen release the A-lines; the EPSILON 7 wingtips then open themselves thanks to the high internal wing pressure.

Sink rate can be further increased by using the speedbar. Depending on the situation the glider can be steered using weight shift.

Remark: Big ears is also possible using two lines (per side) with the EPSILON 7. Here it is important that the glider must be accelerated as well, and the trailing edge must not be braked.

Caution: Do not fly spirals or sharp changes of direction with big ears applied; the increased loading carried by fewer lines can damage the structure.

Caution: Be aware that flying with big ears brings the stall closer. Be careful with the brake lines when big ears are applied, and do not use this descent method if the wing is wet. See also section «Flying with a wet paraglider».

Tip: If you want to lose height as quickly as possible and fly away from a danger zone at the same time we recommend the following: apply big ears and use as much speedbar as conditions allow.

Spiral dive

For the most comfortable way of doing this we recommend a neutral sitting position without active weight shift, and a shoulder-width carabiner distance (approx 45 cm).

Enter the spiral by progressively pulling one brake. Your head and field of view should be directed in the turn direction. As the angle of bank increases so will the rate of turn and centrifugal force.

The behaviour of the spiralling paraglider can be separated into two phases: in the beginning the glider begins with a normal turn which progressively tightens, with increasing angle of bank. In the second phase the paraglider engages its spiral mode. This means that the wing dives forward with an increase of acceleration. During this phase of the manoeuvre try to keep a neutral sitting position and give way to the centrifugal force – your body will be pushed to the outside.

Recovery from the manoeuvre is achieved by progressively releasing the inside brake. While coming out of a spiral dive with high vertical speeds and rotational rates it is essential to release the brake carefully, and/or reapply a little inside brake if necessary, so that you can prevent the wing pitching back excessively, and then diving in front. Make sure that you start the recovery with plenty of height remaining above the ground. Generally speaking you should allow the same amount of time to recover as it took to enter the manoeuvre, but remember that the sink rate will be higher!

The EPSILON 7 comes out of a steep spiral dive by itself if a neutral sitting position is maintained. Active weight shift to the inside of the turn can lead to stronger acceleration and the glider may show less desire to recover by itself.

Caution: The EPSILON 7 was tested in accordance with the latest certification requirements. In a neutral sitting position, and after releasing the inside brake, a spiral dive of up to 14 m/s sink rate recovers by itself. Spirals of higher sink rates can remain in a stable turn if weight shift is applied to the inside of the turn. Weight shift to the outside or pulling outside brake is sufficient to recover from a high sink rate spiral.

Caution: The EPSILON 7 is certified for harnesses in group GH (without rigid cross-bracing). Group GX harnesses (with cross-bracing) or those with very low hang points could drastically alter the flying behaviour in the spiral dive. See section «Suitable harnesses».

Caution: Do not fly spiral dives or aggressive changes of direction with big ears applied: the raised wing loading carried by fewer lines can damage the glider.

B-stall

The whole paraglider structure and its profile shape would be severely strained by a B-stall. We recommend that you don't fly B-stalls on a regular basis. If the B-Stall is to be flown however, recovery must consist of a complete and hesitation-free release of the B-risers, so that normal flight is resumed within two seconds. The B-stall is difficult for light pilots to do because of the high force required.

Stalling

One-sided stall (spin)

When circling tightly in a thermal the EPSILON 7 indicates early and clearly, by strongly increasing brake load, the risk of a stall. Even so, if a wing does stall you will feel a marked reduction of brake load on the inside of the turn. If this happens you must immediately release both brake lines, so that the EPSILON 7 can return to normal flight by itself.

If a wing stalls completely the paraglider will go into a spin / negative rotation. The EPSILON 7 will react dynamically, but will still be manageable by the less experienced pilot. Even so – depending on the situation from which the paraglider is allowed to fly again – the reaction can be quite vigorous (shooting forward with a raised risk of collapse). The canopy can be arrested while shooting forward by well-judged braking. Normal flight can then be resumed without a further collapse.

Tip: Basically, in all out-of-control flight situations, but especially the onset of a one-sided stall, you should immediately release both brakes fully – hands up!

Fullstall

EPSILON 7 brake effect and resistance starts early, but the brake travel is very long. This gives the pilot a high safety margin.

Entry into a fullstall is achieved by progressively and symmetrically pulling down both brake lines. Forward speed reduces. Airflow and wind noise reduce. After reaching minimum speed the paraglider first goes into a brief phase of parachutal stall. Then further brake will cause complete airflow breakaway, and the wing will fall back in fullstall. EPSILON 7 has a strong desire to fly again, but is easy to hold in the stall. A half wrap of the brakes is recommended to fly fullstalls.

To recover, the canopy has to be pre-inflated. To do this the brakes should, at first, be released slowly and symmetrically, and only fully released when pre-inflation is complete. The EPSILON 7 then flies away relatively cleanly, without shooting forward too much.

Tip: Basically, in all out-of-control flight situations, you should immediately release both brakes fully – hands up!

Deep stall

Stable parachutal stall cannot be established, whether attempted by brake or B-stall.

In rain, or if the canopy is wet, the EPSILON 7, like all paragliders, is more vulnerable to parachutal stall. If the wet glider were to go into parachutal stall you should recover only by accelerating using the speedbar. See also section “Flying with a wet paraglider“.

Landing

Always make a proper landing circuit with a well-planned final approach. As the ground approaches progressively increase brake to level the flight-path, before applying full brake to completely arrest the forward speed.

Caution: Steep turn reversals lead to strong swinging of the pilot, and should not be done near the ground.

Caution: Braking will reduce your speed and increase your sink, but it will certainly seriously restrict your ability to manoeuvre.

Caution: Getting below minimum speed leads to stalling: this should unquestionably be avoided when top landing, and on final approach.

Caution: Never let your glider fall to the ground on its leading edge. The overpressure so caused inside the wing can rip the cell walls and damage the leading edge.

Flying with a wet paraglider

Flying with a wet glider creates a risk of deep stall. Deep stall is often the result of a combination of factors. The weight of the wet canopy goes up, and this increased weight increases the angle of attack, which always puts the glider nearer the deep stall limit. Added to this, water drops on the top surface have a detrimental effect on the laminar flow of the boundary layer near the leading edge, which distinctly reduces the maximum lift coefficient. If the wet glider is also being flown at its lower weight limit there is a further small effect of increasing the angle of attack, as well as there being a lower airspeed because of the reduced wing loading.

In order to avoid the risk of deep stall with a wet glider the wing should be braked as little as possible, and big ears not used at all. As a further preventative measure apply moderate (25-40%) speed bar.

All these actions have a small effect in reducing the angle of attack.

Should the wet glider get into deep stall, recovery can only be achieved using the speed bar. See also section «Deep stall».

Winching

The EPSILON 7 is suitable for winch launching. When taking off in windless conditions, ensure that the paraglider is laid out in an arched or even wedge shape (to avoid risk of the glider rosetting):

Winch launch is only permitted if:

- the pilot has completed a tow training course (only Germany/DHV);
- the winch system is certified for use with paragliders;
- the winch operator has been fully trained in paraglider winching.

Paramotoring

Paramotor certification is planned. Further information about this will be released on www.advance.ch

Acrobatics

While developing the EPSILON 7 attention was concentrated on simplicity, safety and user-friendliness – both in general use and flying behaviour.

Appropriate pilot skill and correct technique are essential in order to successfully carry out the following manoeuvres - especially in the expanded weight range: Wingovers, Helicopters, Tail Glide, Reversal and Asymmetric Spiral. The wing was tested to the usual 8g load factor, but is not specially strengthened for acro.

Be aware that dynamic manoeuvres put greater loading on the structure and can shorten the glider's life. This means that a regular check of the paraglider is essential for your safety. In addition there will be the special requirements of your country to be observed.

Maintenance, repairs and care

Packing

Pack your EPSILON 7 rib to rib, so that the plastic rods in the ribs at the leading edge lie as flat as possible on one another, all at the same height. This will prolong your EPSILON 7's life and keep its fast and excellent filling qualities at takeoff. You should randomly offset your packing centreline so that the final chordwise fold is not always along same cell. Only pack and store a dry paraglider, and avoid unnecessary compressing and tight packing.

Care and maintenance

Ultraviolet light, heat, humidity, sea water, aggressive cleaning agents, unsuitable storing and physical abuse (dragging across the ground) speed up the ageing process.

The life of a paraglider can be extended significantly by observing the following advice:

- Allow a wet or damp glider to dry by leaving it completely unpacked at room temperature, or outside in the shade.
- If the glider gets wet with salt (sea) water rinse it thoroughly with fresh water.
- Clean the glider only with fresh water, and a little neutral soap if necessary. Do not use solvents under any circumstances.
- If the glider has been subjected to increased stress (such as a tree landing) have it examined by an expert.
- Regularly remove sand, leaves, stones and snow from the cells. Openings with Velcro closures are provided at the wing tips for this purpose.
- Do not leave the glider out in the sun unnecessarily before and after flight (UV light).
- Do not subject the packed glider to excessive temperature fluctuations, and do ensure adequate air circulation to prevent condensation forming.
- Do not drag the glider across the ground.
- When landing, make sure that the canopy does not fall on its leading edge.

What to do if the leading edge gets damaged?

If a plastic rod breaks or its seam rips the glider must be taken to an ADVANCE checking facility where the rod can be replaced or sewn back in. To guarantee a long lifespan it is important that the wing is not allowed to fall on its leading edge after landing, otherwise the fabric can be damaged by abrasion. But mainly there is a risk, as in all paragliders, that the crossports could tear.

Check

A new ADVANCE paraglider must be given a check every 24 months (2 years). With intensive use (> 150 flying hours per year, or excessively demanding use) an annual check is needed, after the first check. When a check is carried out the condition of all materials is assessed in accordance with strict guidelines, and tested with great care. Finally the overall condition of the glider is rated and recorded in a test report. You can find additional information about the check in this manual in the section «Service», or at www.advance.ch.

Repairs

As a general rule you should not attempt to repair a paraglider yourself. The various seams and lines are made with great precision, and, for this reason, only the manufacturer or an authorised service centre may fit identical replacement parts or replace entire cells. Exceptions to this rule are the replacement of lines and the repair of small tears (up to 5 cm) or holes in the fabric that may be glued with the self-adhesive ripstop included in the repair kit. After a repair, or the replacement of a line, the glider must always be opened out and checked on the ground before the next flight.

Disposal

Environmental protection plays an important role in the selection of materials and the manufacture of an ADVANCE product. We use only non-toxic materials that are subjected to continuous quality and environmental impact assessments. When your paraglider reaches the end of its useful life in a number of years' time, please remove all metal parts and dispose of the lines, canopy and risers in a waste incineration plant.

Technical details

EPSILON 7		**23**	**26**	**28**	**30**
Flat surface		23.0	26.0	28.0	30.0
Projected surface	m^2	19.3	21.8	23.5	25.2
Recommanded takeoff weight [1]	m^t	60-80	75-95	85-110	100-130
Increased takeoff weight [1,2]	kg	80-95	95-110	110-125	-
Glider weight	kg	4.65	5.1	5.45	5.75
Aspect ratio			5.15		
Projected aspect ratio			3.62		
Span	m	10.88	11.57	12.01	12.43
Projected span	m	8.32	8.85	9.19	9.51
Number of cells			45		
Number of risers			3+1		
Max. chord	m	2.63	2.80	2.91	3.01
Min. chord	m	0.59	0.63	0.65	0.68
Riser lengths	cm	48	50	52	54
Max. length of the lines with the risers	cm	677	720	747	773
Min. speed [3]	km/h		23 +/-1		
Trim speed [3]	km/h		38 +/-2		
Max. speed [3]	km/h		51 +/-2		
Trimmer			no		
Paramotor certification LTF 23-05			planned		
Certification			EN / LTF		

1 Pilot, wing, equipment 2 For dynamic flying and/or basic acro manoeuvres
3 Values depend on wing loading, harness/pilot and glider size within the recommended takeoff weight ranges

Materials used

We routinely inspect and test our materials many times over. Like all ADVANCE products the EPSILON7 is designed and produced as a result of the latest developments and knowledge. We have chosen all the materials very carefully, under conditions of the strictest quality control.

Leading edge
Skytex 38 Universal 9017 E25, 38 g/m2

Top surface
Skytex 38 Universal 9017 E25, 38 g/m2

Bottom surface
DOMENICO DOKDO-20MF, 34 gr/m2

Supported ribs
Skytex 40 Hard 9017 E29, 40 g/m2

Unsupported ribs
Skytex 40 Hard 9017 E29, 40 g/m2

Leading and trailing edge reinforcement
Polyester laminate 20 mm

Lower leading edge reinforcement
Polyamid 16 mm

Suspension lines
- Edelrid Aramid 7343-280/230/190/140, covered, 1.8 / 1.7 / 1.5 / 1.3 mm (Base lines)
- Edelrid Aramid 8000/U, 90/70/50, uncovered, 0.8 / 0.7 / 0.5 mm (Upper storey)
- Liros Dyneema, DSL 70 / DFL 115, covered, 0.95 / 1.3 mm (Brake lines)
- Liros Dyneema, DFLP 232, covered 1,9 mm (brake lines)

Risers
Polyester 13 mm

Quicklinks
Maillon Rapide, Inox stainless, 3.5 mm S12

Stitching thread
Polyester

Certification

The EPSILON 7 has EN and LTF B certification. The test reports can be downloaded from www.advance.ch.

Certification ratings can only provide limited information about a paraglider's flying behaviour in thermally active and turbulent air. The certification grading is based primarily on provoked extreme flight manoeuvres in calm air.

During the development of an ADVANCE paraglider, the emphasis is first and foremost on flying behaviour and handling, and not exclusively on the certification test. The result is a well-rounded product with the familiar ADVANCE handling. Nevertheless, the certification rating occupies a significant proportion of the specifications that have to be met.

Service

ADVANCE Service Center

ADVANCE operates two company-owned service centres that carry out checks and repairs of all types. The workshops based in Switzerland and France are official maintenance operations, which have many years' experience and indepth product-specific expertise. The ADVANCE worldwide service network includes other authorised service centres that provide the same services. All service facilities use original ADVANCE materials exclusively. You can find all information on checks and repairs and the relevant addresses at www.advance.ch.

The ADVANCE website

At www.advance.ch you will find detailed information about ADVANCE and its products, as well as useful addresses which you can contact if you have any questions.

Among the things you will be able to do on the website are:

- complete the warranty card online up to 10 days after purchasing the glider, enabling you to enjoy the full benefits of the ADVANCE warranty.
- find out about new safety-related knowledge and advice concerning ADVANCE products.
- download an application form in PDF format which you can use when sending your glider in for a check at ADVANCE.
- find an answer to a burning question among the FAQs (Frequently Asked Questions).
- subscribe to the ADVANCE Newsletter so that you will be regularly informed by e-mail about news and products.

It is well worth visiting the ADVANCE website regularly because the range of services offered is continuously being expanded.

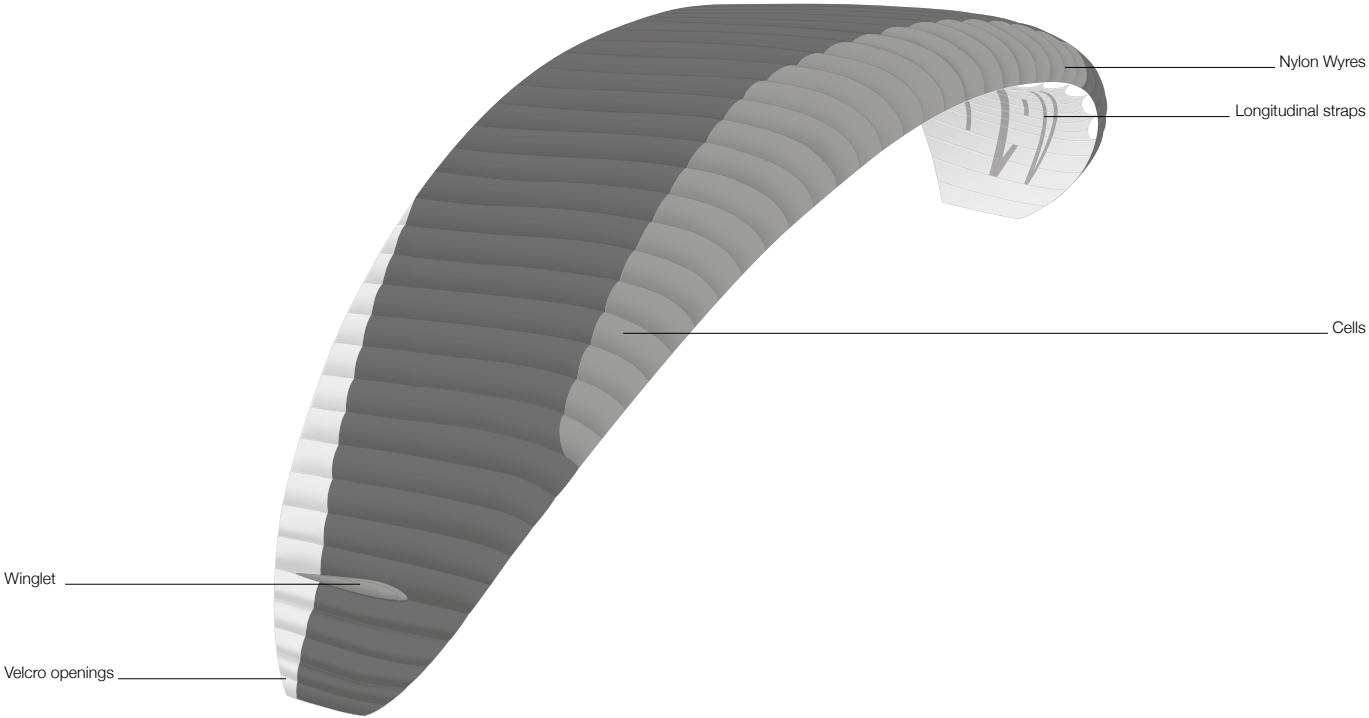
Warranty

In order to enjoy the full benefits of the ADVANCE warranty, you are requested to complete the relevant form on the website in the «Warranty» section within 10 days of purchase.

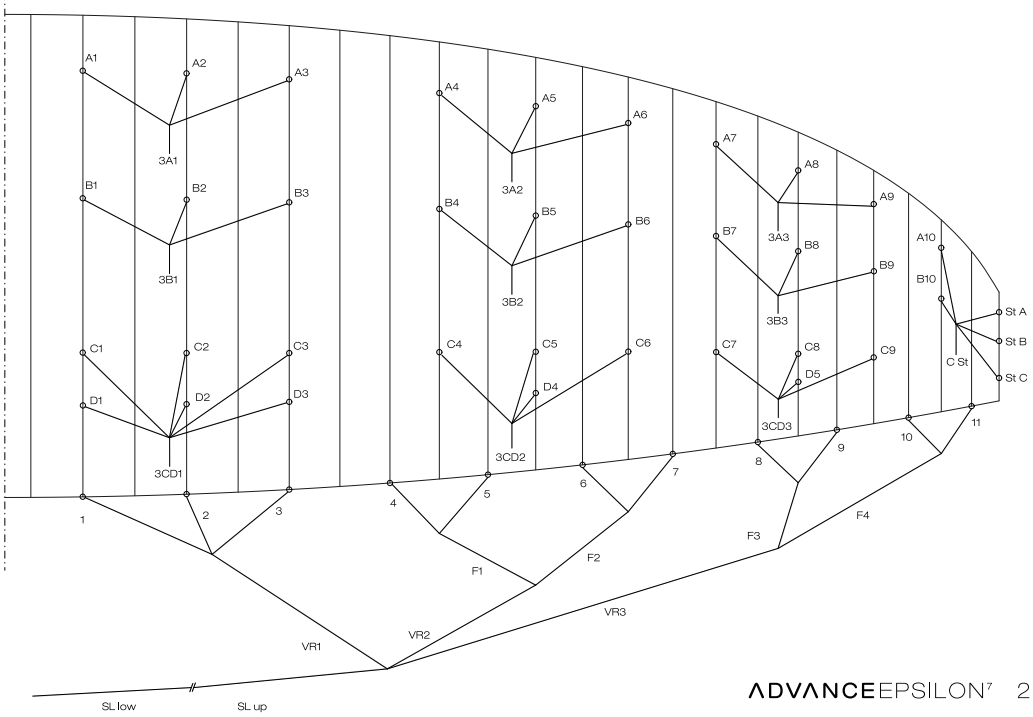
As part of the ADVANCE warranty, we undertake to rectify any defects in our products that are attributable to manufacturing faults. In order for a warranty claim to be made, ADVANCE must be noti- fied immediately on discovery of a defect and the defective product sent in for inspection. The manufacturer will then decide how a possible manufacturing fault is to be rectified (repair, replacement of parts or replacement of the product). This warranty is valid for three years from the date of purchase of the product.

The ADVANCE warranty does not cover any claim other than those listed above. Claims in respect of damage resulting from careless or incorrect use of the product (e.g. inadequate maintenance, unsuitable storage, overloading, exposure to extreme temperatures, etc.) are expressly excluded. The same applies to damage attributable to an accident or normal wear and tear.

List of parts



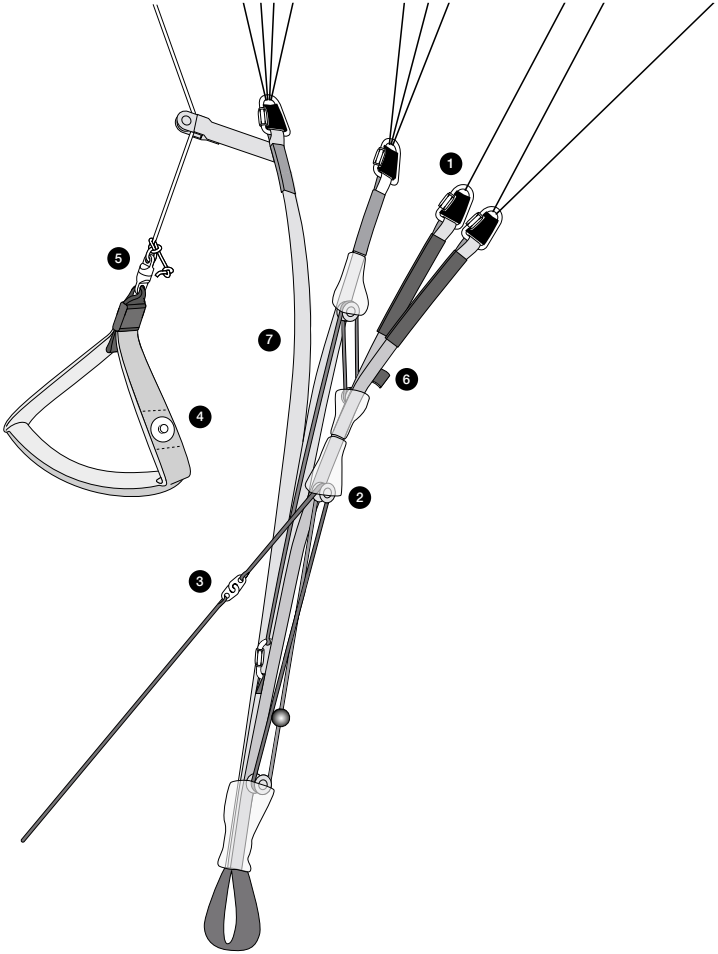
Lineplan



ADVANCEEPSILON^7 23/26/28/30

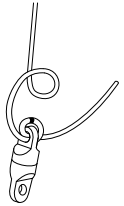
Risers

1. Big Ears System
2. Pulley speed system
3. Quick link
4. Magnetic clips
5. Swivel
6. Speed-Performance-Indicator (SPI)
7. SPI-Scale (Back of the D-risers)



Bowline knot

Step **1**

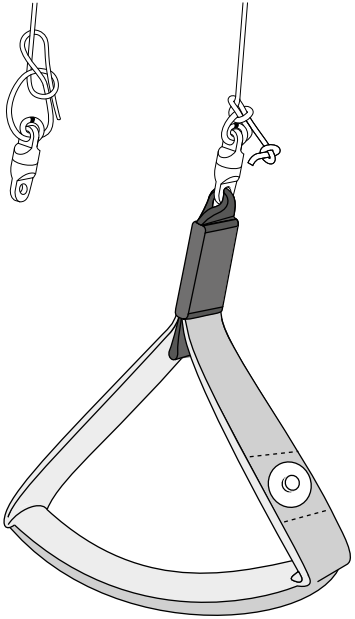


Step **2**

Step **3**

Step **4**

Step **5**



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