



ADVANCE SIGMA 11

Manual Edition 1.1 / 03_2021

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Thank you for flying ADVANCE

Congratulations on your choice of an SIGMA 11 - a quality product from ADVANCE. We hope that you will spend many rewarding hours in the air with it.

This user manual is an important part of the glider. Here you will find instructions and important information about safety, care and maintenance, and that's why we recommend that you read this document carefully before your first flight

Register your SIGMA 11 online on www.advance.swiss/warranty; you will then receive product updates or safety-related bulletins about the SIGMA 11 direct from us. This information will also be available to download from our website at www.advance.swiss, as will the latest version of this manual and further updated information.

If you have any further questions or problems please contact your dealer or get in touch directly with ADVANCE.

Now we wish you a lot of enjoyment with your SIGMA 11, and always «happy landings».

Team ADVANCE

Pioneering spirit and Swiss precision. Our story.

Putting our ideas into the air. That's what we can do. For more than 30 years, ADVANCE have kept the needs and wishes of our pilots at the forefront. With Swiss precision we refine model after model. Highest quality and absolute reliability have our top priority, in the air and in our customer service. So from pioneers we have become perfectionists, and a leading worldwide comprehensive service provider.

SIGMA 11 – Ambitious Cross Country

Once again the SIGMA 11 is up there amongst the highest performing C class wings. The new cross country sportster shows exceptional handling precision in flight and a high level of pitching stability. Its outstanding performance can be called upon any time, even in demanding conditions. Latest technologies like internally sewn miniribs and an effective pitch control arrangement with 2-liner feel finish off this product.

Pilot requirements

The SIGMA 11 is classified as an EN/LTF C wing and is intended, exclusively, for capable cross country pilots who have a number of years flying experience.

An active flying style using brakes, speed system and/or riser control (C-Handles) is required with the SIGMA 11. As the pilot you must be able to recognise canopy disturbances at their onset, and be able to oppose them by means of adequate, appropriate and timely control response. In addition you must be fully familiar with the normal fast descent techniques and be capable of using them when required. Only then will you be able to make use of the high performance potential of the SIGMA 11, and fly far across the countryside, relaxed and safe.

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 actual paraglider. The paraglider pilot is also required bear a sense of responsibility towards the natural world, especially regarding the preservation of wildlife and landscape.

Wearing an adequate helmet, suitable boots and clothing, and carrying an emergency parachute (a 'reserve') 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 all risks, including injury or death, when participating 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.

Getting started

The SIGMA 11 belongs to the “Light sport aircraft” category with an empty weight of less than 120 kg.

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 confirms that defects in the product that can be attributed to manufacturing faults are covered by the ADVANCE warranty. Register your paraglider under www.advance.ch/warranty, and benefit from the ADVANCE warranty for three years. See under “Warranty” in the “Service” section.

Delivery of a SIGMA 11 includes a COMFORTPACK rucksack, a COMPRESSBAG, a repair kit, a mini-windsock in the wing colours and a «Getting Started» booklet.

Basic settings

At delivery the basic set up of the SIGMA 11 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».



Caution: Do not modify your glider – it will no longer be certified.

Adjusting the brake lines

Leave the SIGMA 11 in its factory settings. The brake line lengths have been set for optimal handling, as established by our test team. The free travel of the brake lines makes sure that the trailing edge remains unbraked during takeoff, in fully accelerated flight and when using the C handles.

We recommend a bowline knot for attaching the handles. See illustration in the appendix.


Speedsystem with SPI


Optimal cross country glide between two thermals requires an on-going choice of glider speed as a function of current headwind component, expected next climb quality and the influence of sinking air. The SIGMA 11 speed (accelerate) system has a Speed Performance Indicator (SPI) which helps the pilot make this choice of ideal speed-to-fly. Three positions are indicated on the back of the rear risers: neutral/0 %, 50 % and 100 %. Depending on the relevant parameters the chosen SPI position can be accurately set. Red tabs on the front risers indicate the selected position relative to the SPI markings.

i Info: Thanks to its high stability the SIGMA 11 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 this high performance glider.

Each of the SIGMA 11 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) McCready Speed-To-Fly theory




 **Caution:** Even though the SIGMA 11 has a high degree of stability in accelerated flight you should only use as much speedbar as you feel comfortable with.

 **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 2 m/s) has a relatively stronger adverse affect.

Setting up the speed system

The Speed Performance Indicator (SPI) gives you an indication of the relationship between your accelerate range and your wing's polar curve, and it also indicates whether your speedbar/loop application is symmetrical. It also helps you set up your speed system. Set the length of your speed lines so that you can use the full travel of the speed system, and that the red indicator shows 100% when the second rung of the speedbar/loop is fully extended. This setting should arrange that the first rung reaches approximately the 50% position.

The SIGMA 11 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

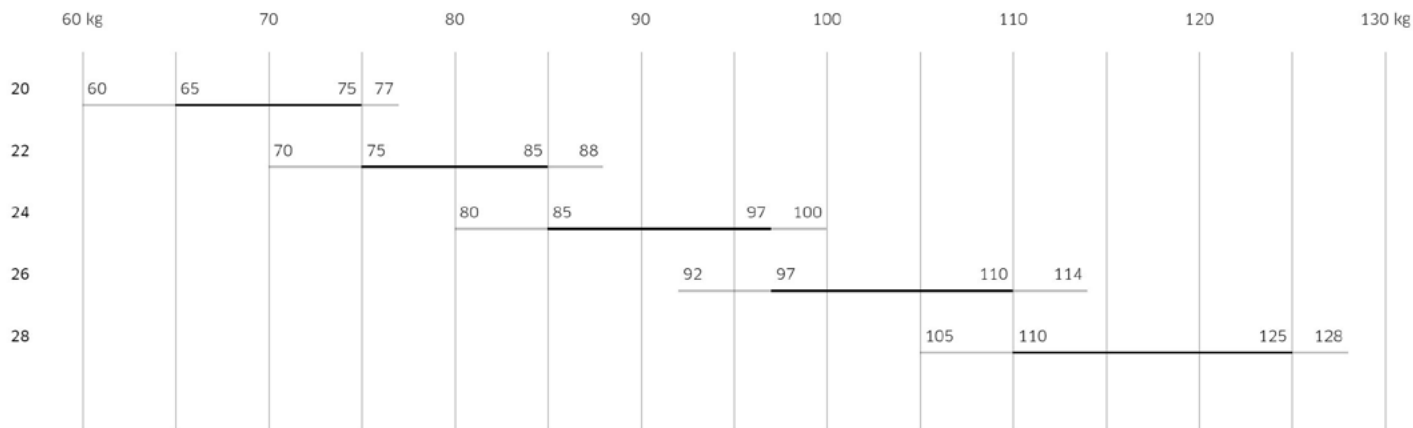
Basically the SIGMA 11 can be flown with any harness that does not have rigid cross bracing (see section “Certification”).

For the tests the following settings were used for the harnesses:

- All-up in-flight weight less than 80 kg: carabiner distance 40 ± 2 cm, height 40 ± 1 cm
- All-up in-flight weight 80 to 100 kg: carabiner distance 44 ± 2 cm, height 42 ± 1 cm
- All-up in-flight weight more than 100 kg: carabiner distance 48 ± 2 cm, height 44 ± 1 cm



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



Weight range

The SIGMA 11 comes out in five sizes. The weight ranges for the different wing sizes are listed in the “Technical Data“ section. The figures given there refer to total take-off weight. This includes the pilot’s body weight including clothing, as well as the weight of all the equipment (paraglider, harness, instruments, etc. – everything that’s going to fly).

Seamless Weight Ranges

The SIGMA 11 was planned for Seamless (continuous) weight ranges, with no overlapping. These arrange that any particular flying weight features in only one glider size. These SIGMA 11 Ideal takeoff Weight Ranges provide the best compromise between speed and climbing performance for all normal conditions, for each glider size.

For special requirements the choice of size still remains in the overlapping sections of the wider Certified Weight Ranges, as for previous models.

Flying outside the Seamless Weight Ranges, in other words near the lower or upper certified weight limits, can alter a paraglider’s flying behaviour and handling, but without affecting your safety. Glide performance remains the same over a complete weight range, but climb performance is altered.

If the SIGMA 11 is flown outside its Seamless Weight Range, in the upper part of its Certified Weight Range, the higher wing loading will raise its trim speed and produce more dynamic and agile flying characteristics.

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 SIGMA 11's handling qualities, from the very beginning.

Takeoff

Connecting the Risers

The SIGMA 11 has an “Easy Connect System” on the risers, to simplify connecting the risers. Each riser has coloured sewing running up the back of the C-riser, red for left and blue for right, in the direction of flight.

The coloured sewing facing the pilot, and the riser running cleanly upward to the lines confirm that the riser has not been connected with an 180 degree twist. For additional assistance all ADVANCE harnesses will, in future, have the same marking on their suspension loops (red to red, blue to blue).

The “Easy Connect System” also enables you to clip in while facing the wing. This can be helpful for a reverse takeoff in windy weather.

Takeoff preparation

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?



Tip: To get the wing in the right shape for takeoff do the following: pull the brake lines in while you are sorting the lines until the canopy arrives at the perfect banana shape.

The SIGMA 11 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.

The SIGMA 11 big ear lines have their own attachments, but the A-risers are not split. SIGMA 11 takeoff is achieved using the A-risers. The canopy fills reliably from the middle, and rises exceptionally straight with little effort.

The SIGMA 11 rises exceptionally easily, so it is very important that you match your pull up technique to the weather conditions and the steepness of the slope. This means:

- In a lot of wind and/or on steep ground the SIGMA 11 needs little or almost no initial tug (just lead it up).
- In zero wind and/or on flat ground a more reasonable impulse would be sensible.

Takeoff in light wind (forward takeoff)

The SIGMA 11 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 directional correcting should only be done by decisive going-under-the-wing, without using the brakes. After any necessary corrections and a satisfactory visual check a few determined steps with good leaning forward will achieve lift off, even in little wind. Careful braking can shorten the takeoff run.

Takeoff in stronger wind (reverse takeoff)

The reverse takeoff is mainly recommended for stronger winds. During the pull-up you should walk towards the SIGMA 11 as necessary to control its rising rate. Turning round and taking off with the SIGMA 11 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 SIGMA 11'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's ground training is worth 10 high flights. But bear in mind that ground practice puts use on the glider.

Normal flight

In calm air the SIGMA 11 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. See also section “Speed system with 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 (e.g. wing swings back when entering a thermal) the brake lines should be briefly released fully, until the glider returns to its overhead position.
- When the angle of attack reduces (e.g. glider shoots forwards) the wing should be briefly and strongly braked.


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


Turning flight

The SIGMA 11 has short and precise brake travel when steering. It responds very directly and progressively to increasing steering inputs, as soon as brake line free travel has been taken up. Active weight shift effectively assists steering. Angle of bank can always be increased, stabilised or reduced by brake line load.

The SIGMA 11 makes a very agreeable companion in thermals. You do not have to correct for large pitching movements, and this improves your climbing behaviour – and therefore your performance – significantly. When thermalling, choose the desired angle of bank and corresponding radius, and try to let the glider turn steadily at this attitude. Outside brake should be used to steady the wing tip and, in particular, control the rate of turn. Anything stronger will slow the wingtip down and lose the glider's good steering qualities.

A harness specifically designed to match the flying characteristics of the SIGMA 11 helps you to initialise and stabilise turns of this type, which should be as even as possible. See also section “Suitable harnesses”.

 **Caution:** To keep good manoeuvrability make sure to fly your SIGMA 11 with enough airspeed while turning in thermals – not too much outside brake.


 **Info:** If a brake line breaks the SIGMA 11 can be steered by careful use of the C-Handles.


Accelerated flight


The SIGMA 11 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 severe turbulence while flying accelerated release the speedbar fully before applying the necessary stabilising brake. The SIGMA 11’s high degree of structural stability allows it to be flown in normally turbulent air while accelerated. Active speedbar should be employed for adjusting angle of attack under these conditions, instead of brake. Pitch attitude disturbances can be minimised in this way, and optimal glide performance can be maintained. See also section “Speed system with SPI”.

- when the angle of attack increases (e.g. wing pitches back when entering lift), the speed bar is briefly pressed harder
- when the angle of attack decreases (e.g. wing pitches forward), the speed bar is released.

 **Caution:** Even though the SIGMA 11 is very stable in accelerated flight you should only use as much speedbar as you feel happy with!

 **Tip:** Make sure that brake is not applied at the same time as speed bar, otherwise you will find yourself in the worst possible gliding situation, without gaining any advantage.

 **Tip:** Always choose a suitable speed for best glide taking into account the actual headwind, sink rate (descending air) and expected next climb.

Using the C-Handles

The SIGMA 11 has a new easy C-handle System (Neopren coated connection on the C-risers). It is possible to steer using these C-handles instead of the brake lines – from trim speed right up to 100% speedbar. Steering and active flying using C-risers (handles) has less affect on performance than using brakes for the same purposes: they brake the wing more efficiently than pulling the trailing edge down; so less speed is lost. Although they also work by increasing angle of attack this increase relative to speed is less than results from a normal brake input.

It is not necessary to use the C-handles at trim speed. Above trim speed active flying by speedbar is a much better option for performance than active flying by C-handles – up to full accelerate.

However, at full accelerated glide the C-handles admittedly become useful. They tell you very directly what is happening to the canopy. You can use them for active flying in that they give immediate notice of impending canopy disturbance so you can prevent a problem at its onset; in a way that only reduces performance slightly. At speed, steering is also very effective with C-handles.

Grap around the C-risers with your whole hand and place your hand on the neoprene coated C-handle connection. Important with the C-handle: Pull so that the B-riser is also pulled down. Make sure you have unwrapped your brakes first.

By careful pulling then releasing you can oppose a forward pitch movement in light turbulence. As well as that, you should also compensate for canopy pressure reduction e.g. as generally occurs before a collapse.



Info: Learning efficient and instinctive C-handle technique needs much practice and experience. Try it out slowly.



Caution: The C-handles should be operated with care and discretion. As with other paragliding activities too much and too abrupt pulling risks stalling.



Caution: C-handle control is only recommended for gliding in calm or lightly turbulent air. In very turbulent conditions ADVANCE recommend releasing the speedbar (and the C-handles) and flying actively with brakes only.

Collapses

Asymmetric collapse

With an active flying technique in normal flying conditions, collapses can be almost completely prevented. The wing gives very precise canopy feedback and makes it possible to sense an impending collapse early on, thus helping timely pilot reaction. Should a collapse occur the wing will fold in a predictable and progressive manner from wing tip towards the centre.

If the glider does, however, suffer a side collapse at trim speed, it will respond to collapses of 50 % or more with a slight turning tendency, allowing heading to be easily held with light counter-steering. Normally, the wing will reopen without pilot action. With an asymmetric collapse in accelerated flight the wing will react more impulsively because of the higher forces associated with higher airspeed. The turning behaviour caused by a collapse at full speed is more dynamic, but can be well controlled.

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.




Caution: If you want to make an accelerated collapse during safety training we recommend that you lead up to it slowly – starting with unaccelerated and then partially accelerated attempts.

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 forcibly encourage reopening by the use of excessive brake, because of the risk of a fullstall.

 **Caution:** When simulating a front collapse it is imperative that ALL A-risers are gripped and pulled down together.

 **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. Help the wing to open with a brief brake impulse by pulling the brakes to 75% within one second, immediately and completely release them, then be prepared to control the forward surge.


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 SIGMA 11 big ear lines have their own attachments, but the A-risers are not split. To apply, pull the outer A-lines briskly downwards at the same time. The wingtips will fold, and can be easily held in this position. Sink speed can be increased by using the speed system while big ears are applied. Depending on the situation the glider can be steered using weight shift. To reopen, release both A-lines at the same time. Opening can be speeded up by a light pull (pump) on the brake. Open the ears one at a time.

 **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 problem area 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, airspeed and centrifugal force, which makes the pilot feel heavier.

The behaviour of the spiralling paraglider can be separated into two phases: in the beginning the glider makes 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 and assumes a more vertical flightpath. During this phase of

the manoeuvre try to keep a neutral sitting position and give way to the centrifugal force – your body will be pulled to the outside of the turn.

To recover keep the neutral sitting position and progressively release the inside brake. Your body weight will be somewhat tipped to the outside. While coming out of a spiral dive of high vertical and rotational speeds some assistance with outside brake is essential. Careful releasing of the inside brake will prevent the wing from recovering too quickly, thus pitching back excessively before diving in front - if the turn stops with too much speed remaining. Make sure that you start the recovery with plenty of height 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 vertical speed will be higher, and much more height will be used!

The SIGMA 11 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 SIGMA 11 only comes out of a spiral dive by itself if the pilot is in a neutral sitting position. From a steep spiral with a high sink rate – more than 14 m/s – recovery requires active outside brake with weight shift to the outside at the same time.stall. A half wrap of the brakes is recommended to fly fullstalls.

! **Caution:** Weight shifting to the inside of the turn results in increased acceleration and stable continued rotation. In this case, active counter-braking with simultaneous weight transfer to the outside of the turn is required to end the manoeuvre (push your body outwards).

! **Caution:** The SIGMA 11 is approved for harnesses in group GH (without rigid cross-bracing). Harnesses in group GX (with cross-bracing) or those with very low suspension points (carabiners) may drastically change the flying characteristics in a spiral.

! **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.

! **Caution:** After recovering from a spiral dive it could be that the pilot flies into turbulence that he has caused. Fly actively to prevent a collapse.

Stalling

One-sided stall (spin)

When circling tightly in a thermal the SIGMA 11 indicates 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 SIGMA 11 can return to normal flight by itself.

If a wing stalls completely the paraglider will go into a spin / negative rotation. The SIGMA 11 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.

i **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!

B-Stall


The whole paraglider structure and its profile shape would be severely strained by a B-stall. We recommend that you do not carry out B-stalls on a regular basis. If you do fly a B-stall the recovery requires that the B-lines are completely released without hesitation, so that normal flight is resumed within 2 seconds. B-stall is difficult for light pilots because of the high force required. 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.

Fullstall

Although the SIGMA 11 responds early to brake input it has very long brake travel, and very high brake load at the stall point. This means a large safety margin for the pilot.

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. The SIGMA 11 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 SIGMA 11 then flies away relatively cleanly, without shooting forward too much.

 **Tip:** As a basic principle you should immediately and fully release both brakes in all out-of-control situations, then be prepared to control the resulting surge carefully.

Deep stall

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

In rain, or if the canopy is wet, the SIGMA 11 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 clearly defined 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 rate, 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.



Handle with care: After landing in water the canopy can quickly fill up, and become very heavy. The canopy should be lifted out of the water by its trailing edge, giving the water a chance to run out. Otherwise it might tear under this unaccustomed heavy load.

Flying with a wet paraglider (risk of deep stall)

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. These actions have a small effect in reducing the angle of attack. If the wet glider does go into deep stall you should recover by using the speed bar only. See also section «Deep stall».

Winching

The SIGMA 11 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.

Acrobatics

Assuming adequate pilot ability and correct technique, the SIGMA 11 lends itself well to flying such manoeuvres as wingovers, SAT, helicopter and asymmetric spiral. The wing was tested to the usual 8g load factor, but is not specially strengthened for industrial strength 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.

Paramotoring

The SIGMA 11 is not certified for paramotoring.

Tandem flying

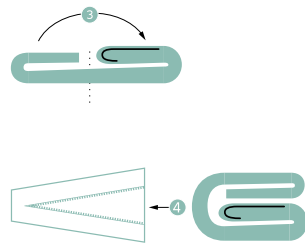
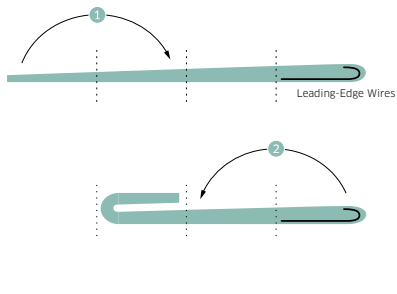
The SIGMA 11 is not certified for tandem flying.

Packing

Packing

Gather the wing together from the middle, and fold it to the width of the compressbag. When folding, lay the wing profiles nose on nose, so that the plastic rods lie as flat as possible on each other, all at the same height. Change your folding centreline on a regular basis so that the centre panel (Logo) does not always contain the foldline.

Always store your wing in a dry and dark place.



Packing with the Tubebag

Packing in a sausage bag is good for the wing, and is easy to do. It avoids undesirable sliding over the ground. Also the shape-retaining storage in a Tubebag promotes long glider life.

Lay your wing, mushroomed as after landing, on the spread Tubebag. Next spread the centre chord out to Tubebag length. Arrange the lines and stow the risers on their tabs. Now gather the leading edge cells as described in "General" above, except that all cells make up one pile – no secondary folding into the centre. Then fasten the upper Tubebag strap over the collected leading edge foils so that it holds them neatly together. Follow the same basic process at the trailing edge. Pull the centre lane straight then flatten and collect the outlying cells as already described above. Do this gently: do not disturb your leading edge positions. Finally close and fold the Tubebag.

Maintenance and checks

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.

Check

The SIGMA 11 must be checked every 24 months, 150 flying hours or 150 flights, whichever comes first. The check should be carried out by an authorised ADVANCE check centre, according to the recommended guidelines.

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.swiss.

Repairs and disposal

Repairs

A paraglider is a lifting surface of complex construction. Seams and lines have been made with great precision. In general, therefore, an unauthorised individual should not carry out paraglider repairs. Only the manufacturer or an authorised Service Organisation should replace components with identical parts, or refit complete cells.

Small repairs become exceptions to this principle. Examples could be repairs to small tears or holes with self-adhesive Ripstop material, or replacing lines. In every case of repair or line change the paraglider must be pulled up on the ground before its next flight, and visually checked.

Your paraglider is delivered with a repair kit containing self-adhesive Ripstop. Other parts, such as lines, quicklinks, softlinks or risers can be obtained from your ADVANCE dealer, an ADVANCE Service Center or direct from ADVANCE. Addresses are on www.advance.ch.

Canopy Repairs

Tears up to 3 cm in length, and very small holes that do not meet a seam, can be patched with the self-adhesive Ripstop from your repair kit. Make sure that the patch is cut out in a round or oval shape, and is big enough to generously overlap the damage. The similar piece of sticky Ripstop on the inside of the repair should be of a different size. Detailed instructions can be found on www.advance.ch.

Line repairs

A damaged line must be changed, without exception. The easiest option is to go to an ADVANCE Service Centre or your ADVANCE dealer. Alternatively you can order the specific replacement line direct from ADVANCE or an ADVANCE dealer and fit it yourself. All the addresses are on: www.advance.ch. Under "Service" on www.advance.ch there are detailed instructions for identifying your line so that you can order it, and then fit it correctly on the wing.

What to do if the leading edge gets damaged?

If a leading edge wire breaks or its seam rips the glider must be taken to an ADVANCE checking facility where the wire 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.

Disposal

Environmental protection plays an important role in the selection of materials and the manufacture of an ADVANCE product. We use only non-hazardous 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

SIGMA 11		20	22	24	26	28
Flat surface	m ²	20.4	22.0	23.6	25.5	27.4
Projected surface	m ²	17.4	18.8	20.1	21.7	23.3
Ideal weight range * **	kg	65–75	75–85	85–97	97–110	110–125
Certified takeoff weight **	kg	60–77	70–88	80–100	92–114	105–128
Glider weight	kg	4.0	4.20	4.45	4.75	5.05
Aspect ratio		6.07	6.07	6.07	6.07	6.07
Projected aspect ratio		4.48	4.48	4.48	4.48	4.48
Flat span	m	11.12	11.56	11.97	12.45	12.90
Projected span	m	8.87	9.17	9.49	9.87	10.23
Certification		EN/LTF-C	EN/LTF-C	EN/LTF-C	EN/LTF-C	EN/LTF-C
Number of cells		65	65	65	65	65
Number of risers		3+1	3+1	3+1	3+1	3+1
Maximum chord	m	2.30	2.39	2.47	2.57	2.66
Max lenght of the risers	cm	51	51	53	55	55
Accelerator tavel max.	cm	13	16	17	18	20
		-	-	-	-	-
Trims		-	-	-	-	-
Max. sym. brake travel at max. weight	cm	63	64	66	68	70
Other adjustable / removable / variable devices		-	-	-	-	-

* Takeoff weight range in which the SIGMA 11 shows the best relationship between flying speed and climb

** Pilot, wing, equipment

Materials used

We routinely inspect and test our materials many times over. Like all ADVANCE products the SIGMA 11 is designed and produced as a result of the latest developments and contemporary knowledge. We have chosen all the materials very carefully, under conditions of the strictest quality control.

Leading edge	Skytex 38 Universal, 9017 E25
Upper surface	Skytex 32 Universal, 70032 E3W
Lower surface	Skytex 32 Universal, 70032 E3W
Profiles	Skytex 40 hard finish 9017 E29
Unsupported profiles	Skytex 32 hard finish 70032 E4D
Main lines	A-8001-230, -130, -190: uncovered
Gallery lines	A-8001-130, -090, -070, -050: uncovered
Brake lines	A-8001-050, A-8001-070: uncovered
Steering lines	A-7850-240: covered A-8001U-190: uncovered
Risers	PES/Technora 12mm
Quick links	Strap 12 mm MR Delta 3.5 mm / S12

Certification

The SIGMA 11 has EN/LTF C certification. The test reports can be downloaded from www.advance.swiss.

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 in-depth 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.swiss.

The ADVANCE website

At www.advance.swiss 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.

Registering your product

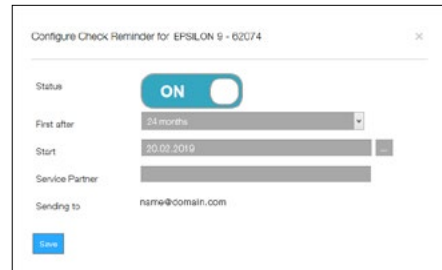
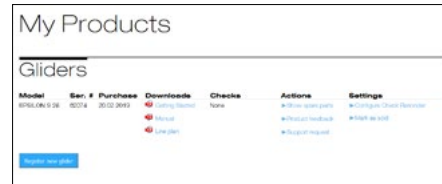
Set up a MyADVANCE-Account on www.advance.swiss/warranty and register your wing direct online after purchase and receive an extended warranty of 12 months beyond the legal warranty period of your country!

In the MyADVANCE-Account you can arrange for a Check Reminder by E-Mail. In addition you can find all the documentation for your wing as PDF, e. g. manual, line plan, check protocol and other information. You can also look at spare parts for your product and ask ADVANCE support direct.

Warranty

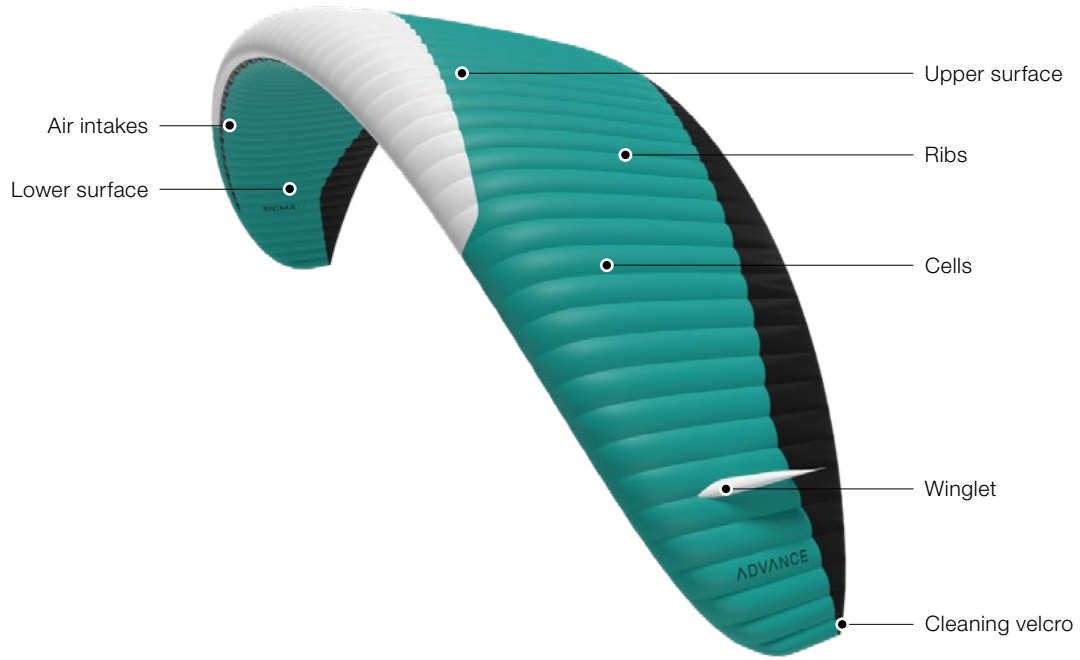
As part of the ADVANCE warranty, we undertake to rectify any defects in our products that are attributable to manufacturing faults. In order for a warranty claim to be made, ADVANCE must be notified immediately on discovery of a defect, and the defective product sent in for inspection. The manufacturer will then decide how a possible manufacturing fault is to be rectified (repair, replacement of parts or replacement of the product). Basically, the legal warranty obligations of your country apply. If you register your product for free on our website within 10 days of purchase you receive an extended warranty of 12 months beyond the legal warranty period of your country!

Warranty and Service Intervals begin from the date of the glider's first flight, recorded on the identification plate. If no date is evident the applicable date is that on which the glider was transferred from ADVANCE to the ADVANCE dealer. The ADVANCE warranty does not cover any other claim. 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.

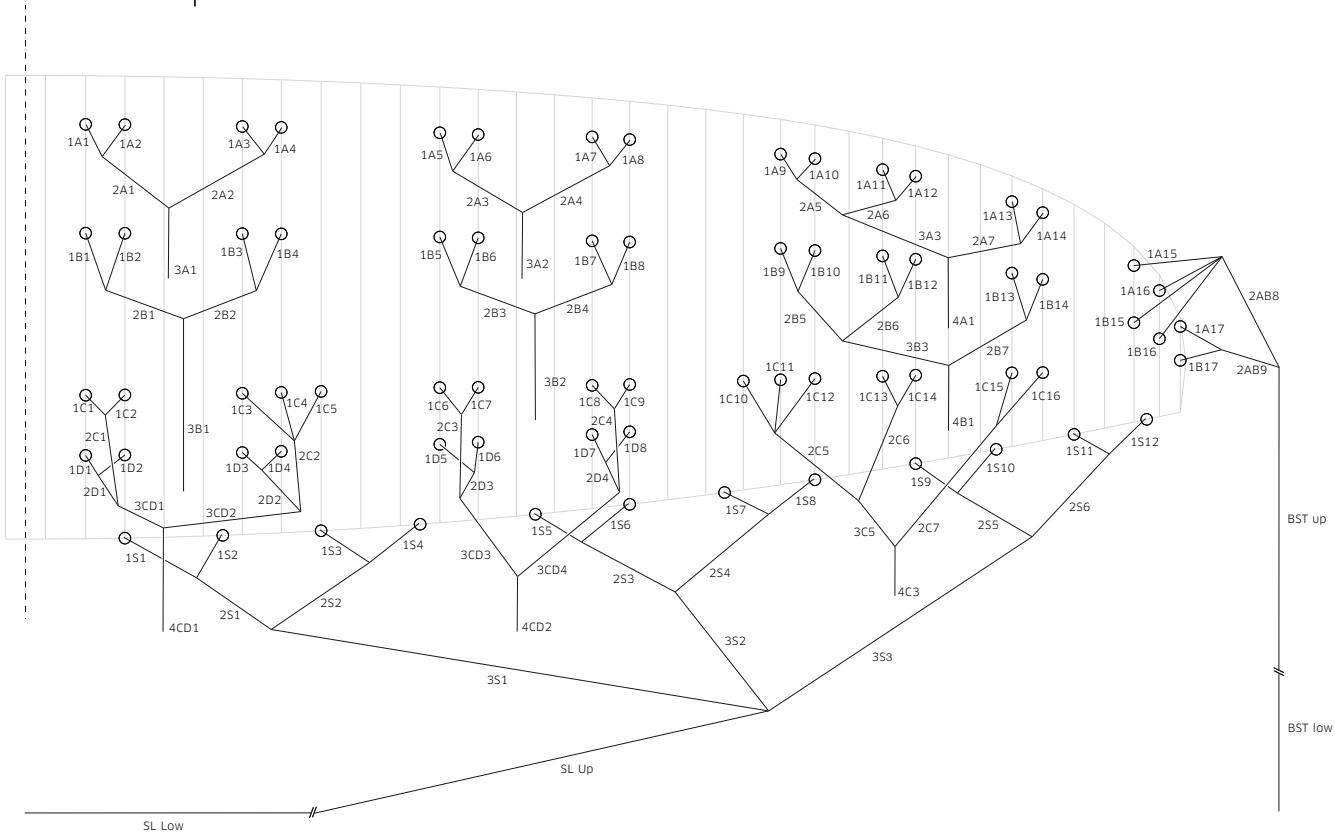


MY ADVANCE

Wing parts



Line plan



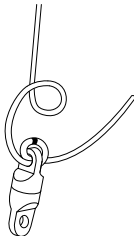
Risers

1. Split A-risers
2. Quicklinks and clips
3. Speed system pulleys
4. Speed Performance Index (SPI)
5. Brummel hooks
6. Magnet clips
7. C-Handle
8. Suspension loop with «Easy Connect System» marks
9. Brake Pulleys



Bowline

Step 1



Step 2



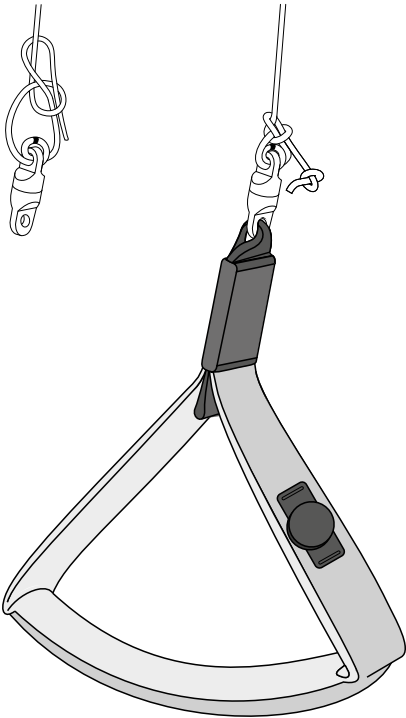
Step 3



Step 4



Step 5



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