

MANUAL



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ECHO Owner's Manual

PARAGLIDER EN / LTF B

Welcome to Bruce Goldsmith Design

BGD is a world leader in the design and production of paragliders. For many years Bruce Goldsmith and his team have been developing products with world-beating performance for pilots who want the best. We apply our competitive knowledge to design top quality products that combine the highest performance with the safe handling our customers value and respect. BGD pilots appreciate our quality and reliability. BGD's world-class status is based on the skills and expertise we have developed in combining aerodynamic design with cloth and materials technology. All BGD products are developed and made with the same skill and attention to good design that are synonymous with the ultimate performance and precision required by paragliders.

Congratulations on your purchase of the BGD ECHO

The ECHO is a lightweight and versatile paraglider, suitable for a wide range of paragliding activities from hike-and-fly to cross-country, vol-bivouac to waggas. It can be flown by pilots who have just completed their training, and offers solid performance with no-stress safety and bags of fun!

Your new paraglider has been designed to a high standard of safety and stability, but it will only retain these characteristics if it is properly looked after.

This manual has been prepared to give you information and advice about your paraglider. If you ever need any replacement parts or further information, please do not hesitate to contact your nearest BGD dealer or contact BGD directly.

Please read this manual carefully from the first to the last chapter to ensure you get the best out of your new wing.

2. Introduction

This glider is not intended to be used for aerobatic manoeuvres.

This paraglider must not:

1. Be flown outside the certified weight range
2. Have its trim speed adjusted by changing the length of risers or lines
3. Be flown in rain or snow
4. Be towed with a tow-line tension in excess of 200 kg

It is your dealer's responsibility to test fly the paraglider before you receive it. The test flight record of this is in Section 9 of this manual. Please be sure that this has been completed by your dealer.

Failure to test fly a new paraglider may invalidate any warranty.

In order to enjoy full benefits of the BGD warranty, you are required to complete the warranty form on the website. For further information, please refer to the corresponding page on our website.

Any modification, e.g. change of line lengths or changes to the speed system, can cause a loss of airworthiness and certification. We recommend that you contact your dealer or BGD directly before performing any kind of change.

3. Preparation

Connecting the speedbar

Your paraglider is sold with accelerator risers and a speed stirrup but can be flown without the speed stirrup attached. The speed stirrup should be connected and adjusted following the instructions in your harness manual to ensure correct routing of the speedbar lines. Connect the Brummel hooks on the speedbar to those on the risers' speed system, ensuring the lines run freely and are not caught around anything (reserve handle, risers or lines).

To adjust the speedbar length, sit in your harness and ask an assistant to hold the risers up into their in-flight position. The speedbar length should be adjusted, by moving the knots, so that the bar sits just beneath your harness seat. You should be able to hook your heels into the bar, and to attain full bar extension (the two pulleys touching). Once you have initially set the bar up in this way on the ground, a test flight in calm air can be used to fine-tune the length, ensuring it is even on both sides.

On launch

1. Select a suitable takeoff area determined by wind and terrain, clear of any obstacles that may catch in the lines or damage the canopy.
2. Take your paraglider to the top of the takeoff area, and allow the rolled canopy to unroll itself down the hill (if on a slope). This should leave the paraglider with the bottom surface facing upwards, the openings at the downwind end of the takeoff area, and the harness at the trailing edge at the upwind side.
3. Unroll the canopy to each side so that the leading edge openings form a semicircular shape, with the trailing edge drawn together as the centre of the arch. The harness should be drawn away from the canopy until the suspension lines are just tight.

Pre-flight inspection

Your paraglider is designed to be as simple as possible to inspect and maintain but a thorough pre-flight procedure is mandatory on all aircraft. The following pre-flight inspection procedure should be carried out before each flight.

1. Whilst opening out the paraglider check the outside of the canopy for any tears where your paraglider may have been caught on a sharp object or even have been damaged whilst in its bag.
2. Check that the lines are not twisted or knotted. Divide the suspension lines into groups, each group coming from one riser. By starting from the harness and running towards the canopy remove any tangles or twists in the lines. Partially inflating the canopy in the wind will help to sort out the lines.
3. It is particularly important that the brakes are clear and free to move. Check the knot which attaches the brake handles to the brake lines. Several knots should be used here to prevent the loose ends from getting entangled in the brake pulleys. Both brakes should be the same length and this can be checked by asking an assistant to hold the upper end of the brake lines together whilst the pilot holds the brake handles. The brake lines should be just slack with the wing inflated when the brakes are not applied. After checking the brake lines lay them on the ground.
4. Always check the buckles and attachments on the harness. Ensure the two main attachment maillons/ karabiners from the harness to the main risers, and the individual shackles which attach the risers to the lines, are tightly done up.
5. Before the pilot attaches himself to the harness he should be wearing a good helmet. Put on the harness ensuring all the buckles are secure and properly adjusted for comfort.

Your paraglider is now ready for flight.

4. Flight Characteristics

This manual is not intended as an instruction book on how to fly your paraglider. You should be a qualified pilot or under suitable supervision, but the following comments describe how to get the best from your wing.

Weight range

Each size is certified for a certain weight range. The weight refers to the 'overall take-off weight'. This means the weight of the pilot, the glider, the harness and all other equipment carried with you in flight.

We recommend your paraglider is flown in the middle of the weight range.

If you fly in the lower half of the weight range, the turning agility will be lower and the glider will be more damped. In strong turbulence the wing tends to deform and to collapse slightly with a lower wing loading. If you mainly fly in weak conditions you might wish to fly towards the lower end of the weight range.

If you fly in the upper half of the weight range, agility and speed will be higher, and you will have greater stability in turbulence, but will be reduced self-damping in turns and after collapses. If you prefer a dynamic flight characteristic you should choose to fly higher in the weight range.

Active Piloting

'Active piloting' is a tool that will help you fly with greater safety and enjoyment. It means flying in empathy with your paraglider. This means not only guiding the glider through the air but also being aware of feedback from the wing, especially in thermals and turbulence. If the air is smooth the feedback can be minimal but in turbulence feedback is continuous and needs to be constantly checked by the pilot. Such reactions become instinctive in good pilots. In order to get the best performance from the wing, the pilot should try to control it though small brake inputs and

weight-shift, rather than constantly being present on the brakes. A small movement early is more efficient than a big brake movement later to control the wing. The more you let the glider fly at trim speed, the better performance you will get out of it. The objective of active piloting is to get the glider to fly smoothly through the air with a stable position above the head, and controlled angle of incidence. Your paraglider is highly resistant to collapse without any pilot action at all, but learning how to fly actively will increase this safety margin even further.

Harness

Your paraglider is tested with a 'GH' (without diagonal bracing) type harness. The GH category includes weight-shift harnesses as well as ABS style (semi-stable) harnesses.

Approved harness dimensions

This glider has been tested with a harness that complies with the EN standard harness dimensions. These are:

Seat board width: 42cm.

The horizontal distance between the attachment points of the paraglider risers (measured from the centreline of the karabiners) must be:

- < 50kg = 38cm
- 50-80kg = 42cm
- > 80kg = 46cm

Take-off

Your paraglider is easy to inflate in both light or stronger winds and will quickly rise overhead to the flying position. The best inflation technique is to hold one A-riser in each hand. It will launch easily using either the forward launch

technique (best for light winds) or reverse launch (best for stronger winds).

Forward Launch

Stand facing into wind with your back to the canopy and all the A lines taut behind you, then take one or two steps back (do not walk all the way back to the canopy). Take an A-riser in each hand (the A-risers are marked with red cloth to make them easier to find) and begin your launch run pulling gently and smoothly on the A-risers. As soon as the canopy starts to rise off the ground stop pulling so hard on the A-risers but put pressure on all the risers evenly through the harness. Maintaining gentle pressure on the A-risers helps in very calm conditions. Have your hands ready to slow up the canopy with the brakes if it starts to accelerate past you.

Reverse Launch

In winds over 10km/h it is recommended to do a reverse launch and inflate the canopy using the A-risers, whilst facing it

Your paraglider has little tendency to overshoot but releasing pressure on the A-risers when it is at about 45° will help to avoid overshooting. The stronger the wind and the greater the pressure on the A-risers, the more quickly the canopy will rise.

Turning

Your wing does not require a strong-handed approach to manoeuvring. For a fast turn smoothly apply the brake on the side to which the turn is intended. The speed with which the brake is applied is very important. If a brake is applied fairly quickly the canopy will do a faster banking turn, but care must be taken not to bank too severely. To attain a more efficient turn at minimum sink, apply some brake to the outside wing to slow the turn and prevent excessive banking. The glider flies very well like this, but care must be taken not to over-apply the brakes as, even though the glider has a low spin tendency, this could result in a spin. The wing will turn far more efficiently if the you weight-shift into the turn in the harness. Remember that violent brake application is dangerous and should always be avoided.

Straight Flight

The paraglider will fly smoothly in a straight line without any input from the pilot. At the maximum in-flight weight, without the accelerator your glider will fly at approximately the trim speed noted in the Specifications table.

Thermalling

To attain the best climb rate your wing should be thermalled using a mild turn, as described above, keeping banking to a minimum. In strong thermals a tighter banking turn can be used to stay closer to the thermal's core. Remember that weight-shifting in the harness will make the turn more efficient and reduce the amount of brake required.

Care must be taken not to apply so much brake as to stall. This is easy to avoid as the brake pressure increases greatly as you approach the stall point. Only fly near the stall point if you have enough height to recover (100m).

Wing Tip Area Reduction (Big Ears)

The big ear facility does not allow you to fly in stronger winds, but allows you to descend quickly without substantially reducing the forward speed of the canopy. B-line stalls also allow for fast descent, but they result in greatly reduced forward speed.

To engage big ears, lean forward in the harness and grasp the outer A-lines, or the maillons of the 'Baby-A' risers if your paraglider is equipped with these (check the Risers diagram in the Technical Data pages of this manual), keeping hold of both brake handles if possible. Pull the outer A-lines or Baby-A risers out and down at least 30 cm so as to collapse the tips of the glider. It is very important that the other A-lines are not affected when you do this as pulling these could cause the leading edge to collapse. Steering by weight-shifting with big ears in is possible. If the big ears do not come out quickly on their own, a pump on the brakes will speed things up.

Before using the big ears facility in earnest it is essential to practise beforehand with plenty of ground clearance in

case a leading edge collapse occurs. Always keep hold of both brakes in order to retain control. Putting your hands through the brake handles so they remain on your wrists is a good method of doing this.

B-Line Stall

This is a fast descent method and is a useful emergency procedure. With both hands through the brake handles, take hold of the top of the B-risers, one in each hand, and pull them down by around 50 cm. This will stall the canopy and forward speed will drop to zero. Make sure you have plenty of ground clearance because the descent rate can be over 10 m/sec. To increase the descent rate pull harder on the B-risers. When you release the B-risers the canopy will automatically start flying again, normally within two seconds. Sometimes the canopy will turn gently when it exits from the B-line stall. It is normally better to release the B-risers fairly quickly rather than slowly, as the latter may result in the canopy entering deep stall.

Always release the risers symmetrically, as an asymmetric release from a B-line stall may result in the glider entering a spin. B-line stalls are useful if you need to lose a lot of height quickly, perhaps to escape from a thunderstorm. They should not be performed with less than 100 m of ground clearance (see also also Chapter 5).

Spiral Dive

A normal turn can be converted into a strong spiral dive by continuing to apply one brake. The bank angle and speed of the turn will increase as the downward spiral is continued. Be careful to enter the spiral gradually as too quick a brake application can cause a spin or an over-the-nose spiral.

If the pilot increases the descent rate of the spiral to over 16 m/s or initiates what is known as an over-the-nose spiral, the glider may require pilot input to recover. In this case all the pilot needs to do is to apply some outside brake and steer the glider out of the turn.

The over-the-nose spiral is a special type of spiral dive where the glider points almost directly at the ground. It will

enter this if you make a sudden brake application during the spiral entry so that the glider yaws around. The nose of the glider ends up pointing at the ground, after which it picks up speed very quickly. This technique is very similar to SAT entry technique, and like the SAT it is an aerobatic manoeuvre, which is outside the normal safe flight envelope. Please do not practise these manoeuvres as they can be dangerous.

Care should be taken when exiting from any spiral dive. To pull out of a steep spiral dive, release the applied brake gradually or apply opposite brake gradually. A sharp release of the brake can cause the glider to surge and dive as the wing converts speed to lift. Always be ready to damp out any potential dive with the brakes. Also be ready to encounter turbulence when you exit from a spiral because you may fly through your own wake turbulence, which can cause a collapse.

CAUTION: SPIRAL DIVES CAN CAUSE LOSS OF ORIENTATION (black out) AND SOME TIME IS NEEDED TO EXIT THIS MANOEUVRE. THIS MANOEUVRE MUST BE EXITED IN TIME AND WITH SUFFICIENT HEIGHT!

Speed System

The paraglider is sold with accelerator risers and a speed stirrup as standard but can be flown without the speed stirrup attached. Launching and general flying is normally done without using the accelerator. The accelerator bar should be used when higher speed is important. A pilot flying at the maximum in-flight weight should be able to reach the Top Speed noted in the specifications table when using the accelerator system. Glide angle is not as good in this format, so it is not necessarily the best way to race in thermic conditions and the canopy is slightly more susceptible to deflations. Using the stirrup can require some effort and the pilot's balance in the harness can be affected. It may be necessary to make some adjustments to the harness. We recommend you only fly in conditions where you can penetrate into-wind with the risers level, i.e. no speed-bar applied, so that you have the extra airspeed should you need it.

To fly at maximum speed the speed stirrup should be applied gradually until the two pulleys on each A-riser touch. Please do not go beyond this point by using excessive force to attempt to make the glider go faster as this may result

in the glider collapsing.

IMPORTANT:

1. Practise using the speed system in normal flying.
2. Be careful flying fast in rough or turbulent conditions as deflations are more likely to occur at speed. The speed increase is achieved by reducing the angle of attack, so the canopy has slightly more collapse tendency.
3. Remember that your glide deteriorates at higher speeds. Best glides are achieved when the risers are level and the brakes are off.

Check the component parts regularly for wear and tear, and ensure that the system always works smoothly.

Landing

Landing is very straightforward. Flare in the normal way from an altitude of around 2 m when landing in light winds. It may sometimes help to take wraps on the brakes to make the flare more effective.

Strong-wind landings require a different technique. If you use the brakes to flare in a strong wind the wing tends to convert this to height. This can be a real problem. The best method is to take hold of the rear-risers at the maillons just before landing, and collapse the canopy using these when you have landed. The glider will collapse very quickly using this method. The glider can also be steered using the rear-risers but be careful not to cause a premature stall.

After landing, the B-risers can also be used to collapse the canopy, although it is more difficult to control the collapsed canopy on the ground with the B-risers.

5. Recovery Techniques

Stalls

Stalls are dangerous and should not be practised in the course of normal flying. Stalls are caused by flying too slowly. Airspeed is lost as brake pressure increases and as the canopy approaches the stall point it will start to descend vertically and finally begin to collapse. Should this occur it is important that the pilot releases the brakes at the correct moment. The brakes should never be released when the wing has fallen behind the pilot; the brakes should be released fairly slowly, to prevent the forward dive of the canopy from being too strong. A pre-release of the brake and the reconstruction of the full span is recommended to avoid the tips getting cravatted during the recovery. Pilots are advised never to attempt this manoeuvre unless under SIV instruction. This manual is not intended to give instruction in this or any other area.

Deep Stall (or Parachutal Stall)

Your paraglider has been designed so that it will not easily remain in a deep stall. However, if it is incorrectly rigged or its flying characteristics have been adversely affected by some other cause, it is possible that it could enter this situation. In the interests of safety all pilots should be aware of this problem, and know how to recover from it. The most common way to enter deep stall is from a flying too slowly, from a B-line stall or even from big ears. When in deep stall the pilot will notice the following:

1. Very low airspeed.
2. Almost-vertical descent (like a round canopy), typically around 5m/s.
3. The paraglider appears quite well inflated but does not have full internal pressure. It looks and feels a bit limp.

Recovery from deep stall is quite simple: The normal method is to simply initiate a mild turn. As the canopy starts to turn it will automatically change to normal flight, but it is very important not to turn too fast as this could induce a spin.

The second method is to pull gently on the A-risers. This helps the airflow to re-attach to the leading edge, but be careful not to pull down too hard as this will induce a front collapse.

If the deep stall is particularly stubborn and the previous methods do not work then a full stall will solve the problem. To do this apply both brakes again fairly quickly, as if to do a strong stall, then immediately release both brakes and damp out the forward surge in the normal way. The canopy will swing behind you then automatically reinflate and surge forward in front of you before returning to normal flight. It is the surge forward that exits the canopy from deep stall.

Spins

Spins are dangerous and should not be practised in the course of normal flying. Spins occur when the pilot tries to turn too fast. In a spin the pilot, lines and canopy basically stay vertical and rotate around a vertical axis. Your glider will resist spinning, but if a spin is inadvertently induced you should release the brake pressure but always be ready to damp out any dive as the glider exits the spin. Failure to damp the dive on exiting the spin may result in an asymmetric deflation.

Symmetric Front Collapse

It is possible that turbulence can cause the front of the wing to symmetrically collapse, though active piloting can largely prevent this from occurring accidentally. A pilot can reproduce the effect by taking hold of both the A-risers and pulling down sharply on them. The glider will automatically recover on its own from this situation in around three seconds. During this recovery period it is advisable not to apply the brakes as this could stall the wing.

Asymmetric Front Collapse

Your paraglider is very resistant to deflations; however if the canopy collapses on one side due to turbulence, you should first of all control the direction of flight by countering on the opposite brake. Most normal collapses will immediately reinflate on their own and you will hardly have time to react before the wing reinflates automatically. The act of controlling the direction

will tend to reinflate the wing. However, with more persistent collapses it may be necessary to pump the brake on the collapsed wing using a long, strong, smooth and firm action. Normally one or two pumps of around 80 cm will be sufficient. Each pump should be applied in about one second and smoothly released. In severe cases it can be more effective to pump both brakes together to get the canopy to reinflate. Be careful not to stall the wing completely if this technique is used.

Releasing a trapped tip (cravat)

Following a severe deflation it is possible for a wingtip to become trapped in the glider's lines (cravat). If this occurs then first of all use the standard method of recovery from a tip deflation as described in Asymmetric Front Collapse above. If the canopy still does not recover then pull the rear risers to help the canopy to reinflate. Pulling the stabilo line is also a good way to remove cravats, but remember to control your flight direction as your number-one priority. If you are very low then it is much more important to steer the canopy into a safe landing place or even throw your reserve.

NOTE: Test pilots have tested your new paraglider well beyond the normal flight envelope, but such tests are carried out in a very precise manner by trained test pilots with a back-up parachute, and over water. Stalls and spins on any paragliders are dangerous manoeuvres and are not recommended.

Loss of brakes

In the unlikely event of a brake line snapping in flight, or a handle becoming detached, the glider can be flown by gently pulling the rear risers for directional control.

6. Storage and Servicing

Storage

If you have to pack your canopy away wet, do not leave it for more than a few hours in that condition. As soon as possible dry it out, but do not use direct heat sources as it is inflammable!

Always store the canopy in a dry, warm place. Ideally this should be in the temperature range of 5°C to 25°C. Never let your canopy freeze, particularly if it is damp.

Your paraglider is made from high quality nylon which is treated against weakening from ultraviolet radiation. However, UV exposure will still weaken the fabric and prolonged exposure to harsh sunlight can severely compromise the safety of your canopy. Therefore once you have finished flying, put your wing away. Do not leave it laying in strong sunshine unnecessarily. If you are concerned about any aspect of the integrity of your paraglider please contact your nearest BGD dealer or talk to BGD directly.

Do not treat your canopy with chemical cleaners or solvents. If you must wash the fabric, use warm water and a little soap. If your canopy gets wet in sea water, wash it with warm water and carefully dry it.

Small tears in the top or bottom surface (not normally the ribs) of a canopy can be repaired with a patch of self-adhesive ripstop nylon. Tears no longer than 100 mm can be repaired in this way providing they are not in a high-stress area. If you have any doubt about the airworthiness of your canopy please contact your dealer or BGD directly.

Servicing / Inspection

It is important to have your glider regularly serviced. Your BGD wing should have a thorough check / inspection every 24 months or every 150 flight hours, whichever occurs first. This check must be made by the manufacturer, importer,

distributor or other authorised persons.

Please print out the service pages from this manual, fill in the number of flights and hours flown in the Service Record, and send together with your glider when it goes for inspection or servicing. The manufacturer will only accept responsibility for paraglider lines and repairs which we have produced and fitted or repaired ourselves.

Environmental protection and recycling

Our sport takes place in the natural environment, and we should do everything to preserve our environment. A glider is basically made of nylon, synthetic fibres and metal. At the end of your paraglider's life span, please remove all metal parts and put the different materials in an appropriate waste/recycling plant.

7. Technical data

Materials

The ECHO is made from the following quality materials:

Top surface:	Dominico D20
Bottom surface:	Porcher Skytex 27g
TE mini ribs :	Porcher Skytex 32g
LE mini ribs:	Porcher Skytex 32g
All ribs:	Porcher Skytex 32g hard white
Risers:	12 mm black nylon webbing
Top lines:	Liros DC
Middle lines:	Edelrid 8000U PPSL200
Lower lines:	Edelrid 8000U PPSL200
Brakes:	Liros DSL

Spare parts can be obtained directly from BGD or through our network of registered BGD repair shops.

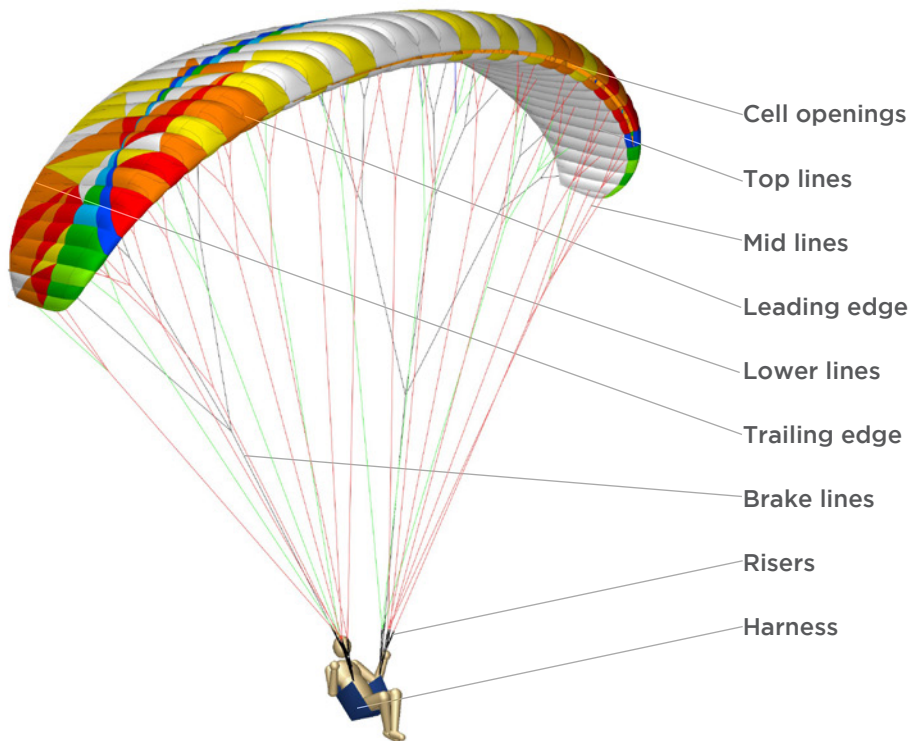
For a full list check www.flybgd.com

Specifications

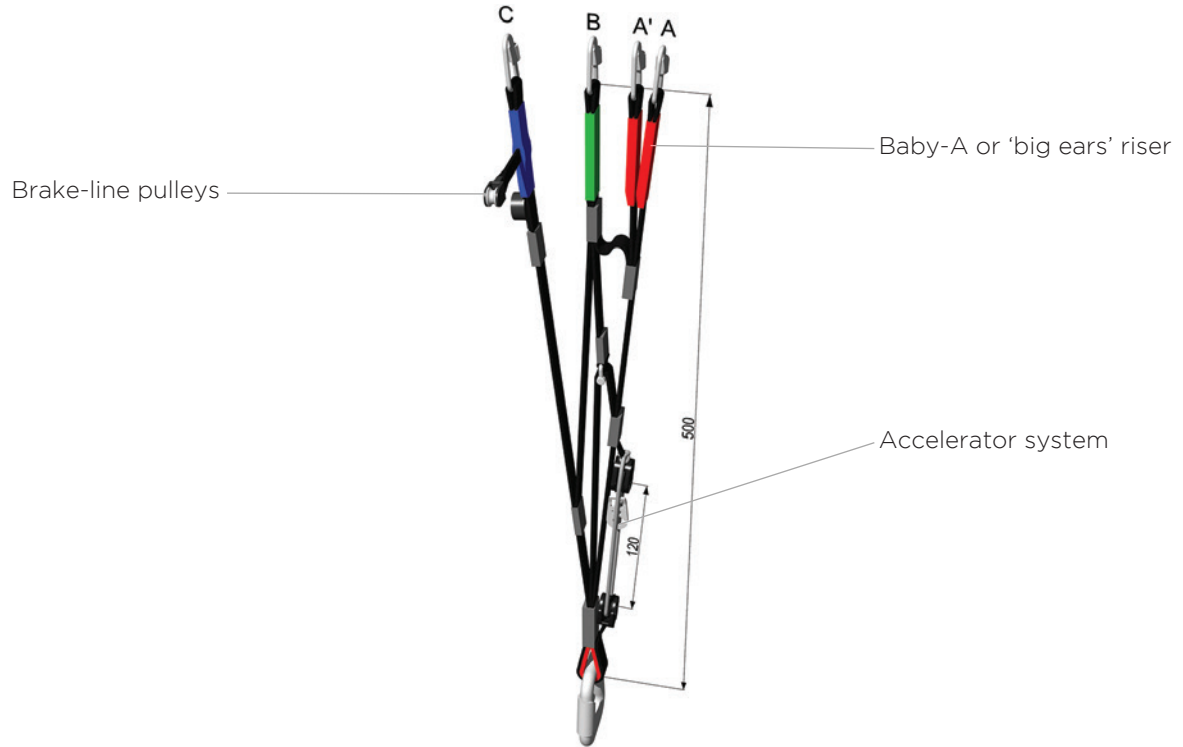
	XS	S	M	ML	L	
Linear scaling factor	0.96	1.00	1.04	1.08	1.12	
Projected area	17.86	19.56	21.24	22.81	24.54	m ²
Flat area	21.00	23.00	24.97	26.83	28.85	m ²
Glider weight	3.7	3.9	4.2	4.4	4.7	kg
Total line length	210	230	250	268	289	m
Height	6.7	6.979	7.3	7.5	7.8	m
Number of main lines A/B/C	3/4/3	3/4/3	3/4/3	3/4/3	3/4/3	
Cells	42/80	42/80	42/80	42/80	42/80	
Flat aspect ratio	5.01	5.01	5.01	5.01	5.01	
Projected aspect ratio	3.602	3.602	3.602	3.602	3.602	
Root chord	2.58	2.70	2.81	2.91	3.02	m
Flat span	10.26	10.73	11.18	11.59	12.02	m
Projected span	8.02	8.39	8.75	9.07	9.40	m
In-flight weight range	50 - 65	60 - 80	75 - 95	90 - 110	105 - 125	kg
Trim speed	38	38	38	38	38	km/h
Top speed	50	50	50	50	50	km/h
Min sink	1	1	1	1	1	m/s
Best glide	9	9	9	9	9	
Certification	EN+LTF: B	EN+LTF: B	EN+LTF: B	EN+LTF: B	EN+LTF: B	

* In progress

Overview of glider parts



Risers

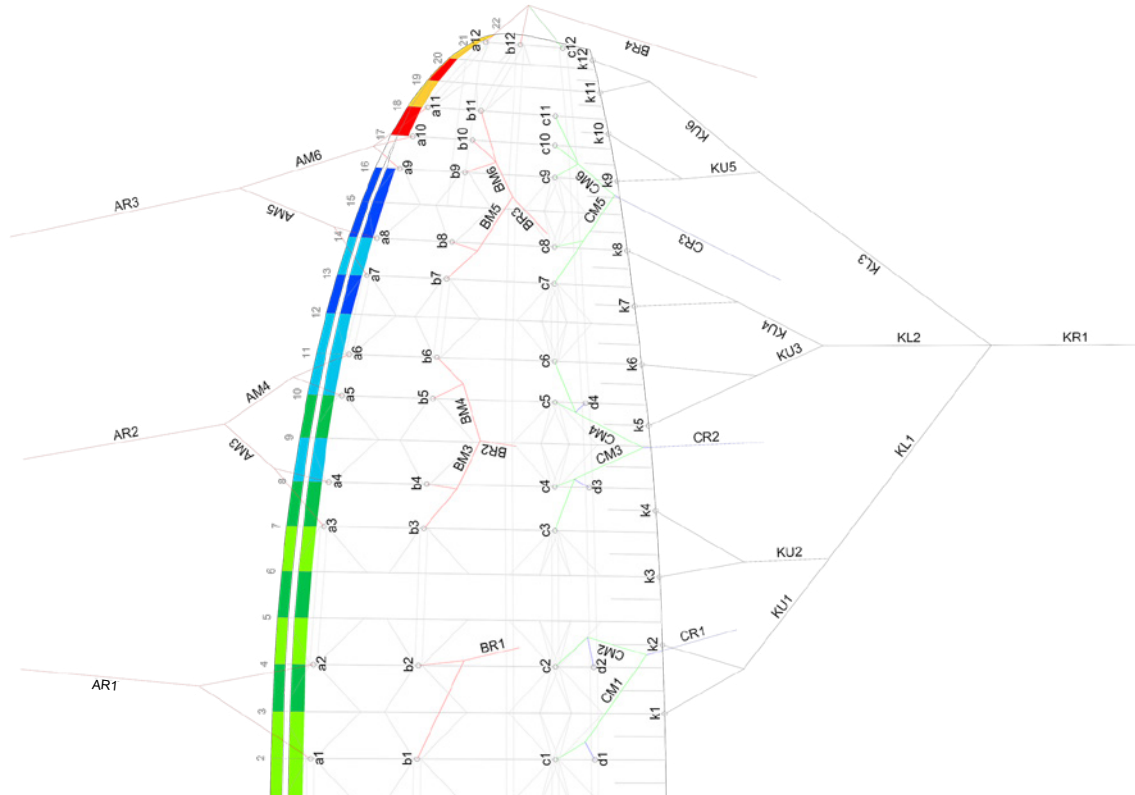


The riser set does not have trimmers, or any other adjustable or removable device.

Brake and speedbar travel

Size	Accelerator range	Brake range min weight	Brake range Max weight
XS	12cm	> 55cm	> 55cm
S	14cm	> 55cm	> 60cm
M	14cm	> 55cm	> 60cm
ML	14cm	> 60cm	> 65cm
L	14cm	> 65cm	> 65cm

Line Plan



Line length checks

Size XS

Size S

Size M

	A	B	C	D	K	A	B	C	D	K	A	B	C	D	K
1	6604	6534	6646	6713	6747	6942	6862	6982	7054	7038	7207	7119	7260	7330	7357
2	6572	6501	6615	6679	6616	6910	6829	6951	7021	6902	7174	7085	7229	7296	7217
3	6581	6515	6627	6653	6526	6921	6848	6956	6988	6810	7189	7108	7238	7265	7122
4	6549	6481	6585	6639	6516	6887	6813	6916	6973	6801	7154	7071	7193	7251	7114
5	6544	6484	6582		6403	6881	6816	6913		6684	7149	7076	7191		6994
6	6581	6529	6625		6323	6920	6863	6955		6600	7189	7125	7238		6907
7	6453	6447	6555		6298	6785	6766	6885		6575	7049	7024	7163		6881
8	6400	6386	6489		6352	6729	6702	6816		6631	6991	6958	7091		6941
9	6313	6316	6417		6257	6637	6627	6741		6531	6894	6880	7013		6835
10	6235	6268	6389		6216	6555	6576	6711		6487	6809	6827	6982		6789
11	6232	6277	6394		6152	6550	6586	6717		6419	6804	6837	6988		6719
12	5905	5908	5987		6100	6200	6205	6291		6364	6440	6439	6522		6661

Size ML

Size L

	A	B	C	D	K	A	B	C	D	K
1	7473	7388	7528	7604	7600	7225	7140	7280	7355	7901
2	7440	7354	7497	7570	7456	7191	7106	7248	7321	7754
3	7457	7384	7516	7546	7359	7209	7133	7261	7290	7655
4	7421	7347	7469	7532	7352	7172	7095	7213	7277	7649
5	7417	7352	7468		7229	7168	7101	7212		7522
6	7460	7403	7516		7139	7212	7154	7263		7428
7	7317	7308	7438		7112	7063	7047	7182		7402
8	7257	7240	7363		7174	7000	6975	7105		7466
9	7159	7160	7282		7065	6897	6892	7021		7351
10	7072	7106	7250		7017	6806	6835	6988		7301
11	7068	7117	7256		6943	6800	6846	6994		7225
12	6726	6729	6818		6883	6418	6418	6506		7162

All measures are in mm, with 50N line tension, this tension being slowly and gradually applied before taking the measurement.

The lengths are measured from the lower surface of the canopy and include the risers.

Bridle lengths

Size XS

Rib	A-lines			B-lines			C-lines			D-lines		Rib	Brakes				
2	1355	4723		1344	4667		678	759	4702	747		r 3	898	1151			
4	1322			1310			659	747		725		r 4.5	767				
7	562		4295	555		4370	672					r 6	719	1109	2000		
8	529	1200		521	1070		630	1186	4262			r 7.5	709				
10	483			472			594			699		r 9.5	707				
11	521	1241		517	1122		637	1219		653		r 11	626	839	2159	2699	
13	542			535			543					r 12.5	587				
14	489	1889		474	1066	4326	477	909				r 14	641	853			
16	594		3502	573			581		4597				r 16	462	656		
17	517	1697			526	896	553	732					r 17.5	421			
18	513			535			558					r 19	321	692	2440		
21	1109			1112	4286		1191					r 20.5	269				

red = loop on maillon

Bridle lengths

Size S

Rib	A-lines			B-lines			C-lines			D-lines		Rib	Brakes			
2	1419		4980	1406		4917	707	800	4953	781	r 3	940	1204			
4	1387			1373			687	789		759	r 4.5	804				
7	589			581			700				r 6	752	1164	2116		
8	555	1257	4532	546	1120	4608	660	1278	4456	734	r 7.5	743				
10	506			494			623			685	r 9.5	740				
11	545	1300		541	1175		665	1312			r 11	656	878	2288	2778	
13	568			560			567				r 12.5	615				
14	512	1979		496	1116		498	950			r 14	671	894			
16	623		3700	600		4553	608		4846		r 16	484	687			
17	541	1776		549	937		578	765			r 17.5	440				
18	536			559			584				r 19	336	723	2582		
21	1157			1162	4508		1248				r 20.5	281				

red = loop on maillon

Bridle lengths

Size M

Rib	A-lines			B-lines			C-lines			D-lines		Rib	Brakes		
2	1478	5201		1464	5131		743	824	5176	815	r 3	979	1253		
4	1445			1430			722	813		792	r 4.5	839			
7	613			605			733				r 6	782	1215	2223	
8	578	1309	4739	569	1165	4813	688	1292	4696	762	r 7.5	774			
10	527			514			649			711	r 9.5	771			
11	568	1355		563	1224		696	1329			r 11	683	914	2408	2902
13	592			583			591				r 12.5	640			
14	534	2061		516	1162		519	989			r 14	699	932		
16	648		3873	625		4757	633		5066		r 16	504	715		
17	563	1850		572	976		602	797			r 17.5	458			
18	558			582			608				r 19	350	753	2713	
21	1216			1215	4714		1298				r 20.5	293			

red = loop on maillon

Bridle lengths

Size ML

Rib	A-lines			B-lines			C-lines			D-lines		Rib	Brakes			
2	1530	5405		1517	5337		766	856	5389	844	r 3	1015	1298			
4	1497			1483			745	846		820	r 4.5	871				
7	635			627			759				r 6	810	1262	2321		
8	599	1355	4929	590	1208	5015	712	1340	4900	791	r 7.5	803				
10	546			533			672			738	r 9.5	799				
11	589	1404		584	1270		720	1379			r 11	709	947	2517	2966	
13	613			604			614				r 12.5	663				
14	553	2135		536	1205		539	1027			r 14	725	966			
16	671		4036	648		4967	657		5280		r 16	523	742			
17	584	1919		594	1013		625	828			r 17.5	475				
18	580			605			631				r 19	363	780	2834		
21	1254			1257	4942		1346				r 20.5	303				

red = loop on maillon

Bridle lengths

Size L

Rib	A-lines			B-lines			C-lines			D-lines		Rib	Brakes				
2	1588	5629		1573	5563		799	885	5589	876		r 3	1052	1345			
4	1554			1539			777	875		851		r 4.5	905				
7	659			650			788					r 6	839	1311	2424		
8	621	1406	5137	612	1252	5227	740	1388	5088	819		r 7.5	833				
10	566			552			698			764		r 9.5	828				
11	610	1457		606	1317		748	1429				r 11	735	982	2632	3100	
13	636			626			635					r 12.5	688				
14	574	2215		555	1249		558	1063				r 14	752	1002			
16	697		4208	672		5169	680		5487			r 16	542	769			
17	605	1989		615	1049		647	857				r 17.5	492				
18	600			625			654					r 19	377	808	2960		
21	1307			1306	5121		1395					r 20.5	314				

red = loop on maillon

8. Service Booklet

Test Flight Record

Model

Size

Serial Number

Colour

Date of test flight

Company signature and stamp

Service Record

Service No 1:

Date :

Stamp - Signature :

No flights :

Type of service :

Service No 2:

Date :

Stamp - Signature :

No flights :

Type of service :

Service No 3:

Date :

Stamp - Signature :

No flights

Type of service :

Owner Record

Pilot No 1

First name

Family name

Street

City

Post code

Country

Telephone

Email:

Owner Record

Pilot No 2

First name

Family name

Street

City

Post code

Country

Telephone

Email:

9. Closing Words

Your paraglider is an advanced, stable glider that promises many hours of safe and enjoyable flying, provided you treat it with care and always respect the potential dangers of aviation.

Please always remember that flying can be dangerous and your safety depends on you. With careful treatment your wing should last for many years. It has been tested internationally under current airworthiness standards, and these represent the current knowledge concerning the safety of a glider. However, since there are still many unknown issues, for example the effective lifespan of the current generation of gliders and how much material material ageing is acceptable without affecting the airworthiness. There are natural forces that can seriously threaten your safety, regardless of the quality of construction or the condition of your glider. Your security is ultimately your responsibility. We strongly recommend that you fly carefully, adapt to the weather conditions and keep your safety in mind.

Flying in a club or a school with experienced pilots is highly recommended.

We recommend that you fly with a standard harness with back protection and a reserve parachute. Always use good equipment and an approved helmet.

See you in the sky!

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