GIN

# Bolero 4 Owner's Manual

Including Bolero 4 paramotor operating manual

Please read this manual prior to your first flight with the Bolero 4

Rev.1.2, 07/07/2012

## Thank You...

Thank you for choosing the Bolero 4. We are confident that this paraglider will provide you with countless happy experiences as you progress in your flying career. This manual contains all the information you need to fly and maintain your paraglider. A thorough knowledge of your equipment will keep you safe and enable you to maximize your full potential.

Please pass on this manual to the new owner if you do resell your glider.

Happy Flights and Safe Landings,

The GIN Team

## Safety Notice

By the purchase of our equipment, you are responsible for being a certified paraglider pilot and you accept all risks inherent with paragliding activities including injury and death. Improper use or misuse of GIN equipment greatly increases these risks. Neither Gin Gliders Inc nor the seller of GIN equipment shall be held liable for personal or third party injuries or damages under any circumstances. If any aspect of the use of our equipment remains unclear, please contact your local paragliding instructor, GIN reseller or the importer in your country.

# Contents

# 1. Gin Gliders

Gin Gliders was formed in 1998 by paraglider designer and competition pilot Gin Seok Song and his team of engineers and test pilots.

Gin's philosophy is simple: to design gliders that he, and any other pilot, loves to fly. This philosophy applies equally for an entry-level wing such as the Bolero 4, as for the world-beating competition glider, the Boomerang. No glider is released to the market without Gin's complete satisfaction.

Gin is probably the world's most experienced designer and manufacturer of paragliders, having started when the sport of paragliding was born. He is backed by an equally experienced team, both within the company in Korea and throughout a worldwide network of distributors and dealers. GIN Team pilots have won the Paragliding World Cup numerous times and have had countless other competition successes in World Cups, World and National Championships. This high level of expertise provided by dedicated professionals ensures that you get the best possible product support and after sales service.

# 2. Introducing the Bolero 4

The Bolero 4 is a new concept in an entry-level wing. Designer Gin Seok Song has drawn on all his years of experience to produce a wing that is uniquely in tune with the needs of today's pilots. The Bolero 4 offers outstanding security, with precise but forgiving handling. This allows the pilot to accurately feel the sensations of flight, and thus develop an active flying style. Rapid progression up the learning curve is enabled, as the pilot becomes well acquainted with the myriad of different movements and moods of the air. The Bolero 4 will allow you to experience the full pleasure of free flight, without ever compromising your safety.

## For Pilots Who...

The Bolero 4 is an ideal first glider, and is also suitable for the more experienced club pilot who flies infrequently and wants a good performing glider with the highest safety margin. The Bolero 4 is designed for all kinds of flying, from the first steps at the paragliding school training slope via ridge soaring to thermalling and cross country.

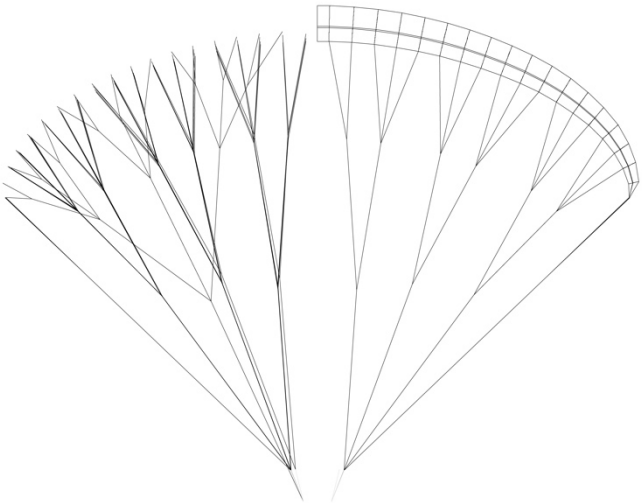
The Bolero 4 is suitable as a paramotor trainer glider as well as for more experienced paramotor pilots who don't fly very often and therefore require a paramotor glider with a high level of safety. The Bolero 4 is suitable for all kinds of paramotor flights from training flights to precision flying near the ground (kicking sticks) up to big cross country flights.

## Cutting-edge Design

Gin has made extensive improvements in the Bolero 4 compared to its predecessor, the Bolero 3. Performance, take-off and handling characteristics have been improved without sacrificing security.

Rigifoil reinforcements at the leading edge have been introduced. This improves take-off characteristics, performance and increases the lifetime of the canopy.

The brake line layout features an extra upper line that gives the wing an even more precise feel.



Weight and drag have been reduced by using thinner yet very strong line materials and by the introduction of a new, hi-tech, light fabric.

These and other innovations ensure that by purchasing the Bolero4, you are getting the best possible glider in its class.

## Manufacturing

All GIN gliders are produced in the company's own facilities using the most modern techniques. Highly skilled staff take extreme care during the entire manufacturing process. Stringent quality control is made after each step, and all materials that go into each wing can be traced. These measures guarantee that pilots fly with the assurance that their wing meets the most exacting safety standards.

# 3. Before you Fly

## Pre-delivery Inspection

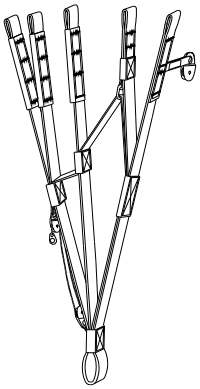
The Bolero 4 is delivered with speed system, rucksack, inner bag, riser cover, compression strap, repair tape and this manual. Your instructor or dealer should have made a test inflation followed by a test flight before delivery. Each Bolero 4 is checked for conformity with the EN and LTF tested specimen before it leaves the factory.

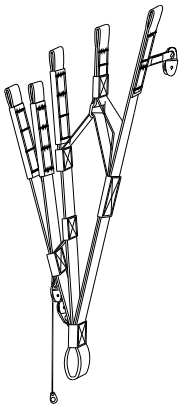
## Speed System

The speed system increases the maximum speed by lowering the angle of attack with a pulley-guided, foot-operated system. Approx. 10 km/h gain in speed can be realized with the accelerator at full travel.

It is important to have your accelerator system correctly routed through your harness and attached to the risers with the supplied Brummel hooks. The length of the speed bar should be initially adjusted while on the ground, sitting in the harness so that the legs are fully extended at the point of full accelerator travel. It is helpful to have an assistant hold the risers taut while making this adjustment. Subsequent fine tuning can be done on the ground following the first flight with the speed system. If in doubt about this procedure, consult your instructor or dealer.

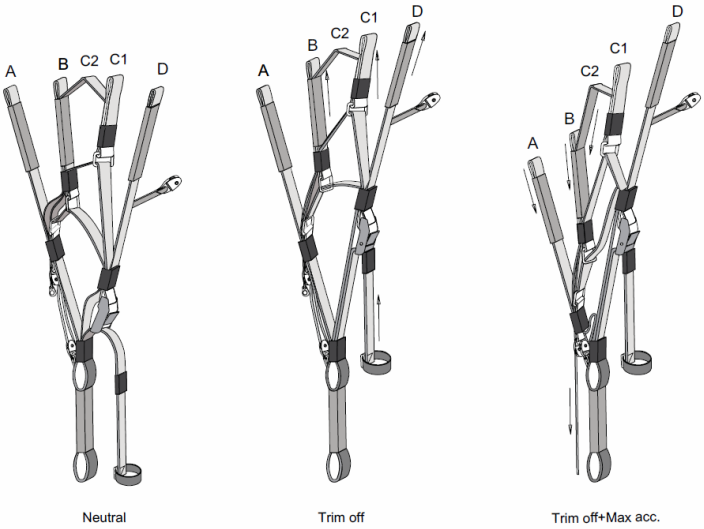
| Riser | A | B | C | D |
|---|---|---|---|---|
| length at trim speed | 48cm | 48cm | 48cm | 48cm |
| length at full speed | 37cm | 39cm | 43.5cm | 48cm |





## Flying with motor

The Bolero 4 can be equipped with risers which have trimmers in addition to the accelerator system.




The Trimmers are not certified for flying without a motor. For free flight, the trimmers should be deactivated and hooked into the carabiners.

| | Risers | A | B | C | D |
|---|---|---|---|---|---|
| Length neutral | (lower hang point) | 52cm | 52cm | 52cm | 52cm |
| | (upper hang point) | 44cm | 44cm | 44cm | 44cm |
| Length accelerated | (lower hang point) | 39cm | 41cm | 46.5cm | 52cm |
| | (upper hang point) | 31cm | 33cm | 38.5cm | 44cm |
| Length accelerated trimmers open | (lower hang point) | 39cm | 41cm | 49cm | 57cm |
| | (upper hang point) | 31cm | 33cm | 41cm | 49cm |

IMPORTANT NOTICE: Accelerator and trimmers should not be used near the ground or in turbulent conditions. The use of accelerator and trimmers reduces the angle of attack which can lead to a more aggressive post-collapse behaviour.

## Brake line adjustment

The main brake line lengths of the Bolero4 correspond to the ones used in the EN and LTF test flights. These line lengths have been fine tuned by GIN test pilots, and it should not be necessary to adjust them.

In soaring flight, it is common to fly with half a wrap on the brakes. However, care should be taken to release the wraps in any extreme situation.

If you do need to make adjustments to suit your harness, body and flying style, we strongly recommend that you test fly the glider after every 2cm of adjustment. There should be a minimum of 10cm of free brake travel when the glider is flown hands-off. This prevents the brakes being applied unintentionally when the speed system is fully engaged. We recommend a double sheepshank or a bowline knot for the brake handle attachment as shown in the diagram.


## Length of the main brake line of Bolero 4

| Size | 22 | 24 | 27 |
|---|---|---|---|
| Length / cm | 239 | 255 | 270 |

## Rucksack

All Gin gliders are delivered with a durable ripstop KODURA® rucksack, designed for ergonomic carrying comfort and ease of use.

The rucksack should be packed carefully to achieve maximum comfort. First, place the glider inside the harness and then put the top of harness in the bottom of the rucksack with the glider side next to the back of the rucksack. Finally, tighten the internal and external compression straps and adjust the shoulder and waist straps to ensure the equipment stays firmly in place when walking. There are also two storage pockets for accessories.

An XXL rucksack (200L capacity) is available as an optional extra for pilots that require it.



"X Load System" is a new compression system created by the GIN R&D team, using Hypalon material. Its concept is based on a 4 point cross bracing at the bottom of the rucksack to obtain an optimum distribution of weight."

## Your harness

The Bolero 4 has been tested with a harness with a variable chest strap and without fixed cross-bracing. Ancient harnesses with fixed cross-bracing are not suitable for flying with the Bolero 4 and should not be used. Check with the manufacturer of the harness or your paragliding instructor if in doubt.

The adjustment of the harness chest strap controls the distance between carabiners and affects the handling and stability of the glider. Tightening the chest strap increases stability, lengthening it gives more feedback from the glider decreases stability.

Gin calculates and draws the plan of the glider with a distance between the carabiners of 44cm. We recommend a setting a distance of 42cm to 50cm between the carabiners, depending on the size and design of the harness. There is no need to fly with a tight chest strap setting with the Bolero 4, as there is no tendency for it to feel unstable.

## Certified Weight Range

The Bolero 4 must be flown within the certified weight range given in the reference section at the back of this manual. The weight range is quoted as the total weight in flight, i.e. the weight of the pilot, glider, harness and accessories. The easiest way to check your total weight is to stand on weighing scales with all your equipment packed into your rucksack. In most cases, the difference between your

body weight and your total flying weight will be around 20 kg. For paramotor flight the additional weight of the engine and fuel must also be taken into account.

## Pre-flight safety

To fly this equipment you should:

- ✓ Have appropriate practical and theoretical training and experience for this class of glider.
- ✓ Have the necessary insurance and licences.
- ✓ Be in your right mind, unaffected by extreme stress, recreational or prescribed drugs.
- ✓ Only fly in conditions suitable for your level of paragliding.
- ✓ Wear suitable head protection, use a certified harness and emergency parachute.
- ✓ Make a thorough pre-flight check.

# 4. Flying the Bolero 4

We recommend that you first practice inflating your glider on a small training hill, or flat ground. Make your first flights with your new paraglider in gentle conditions on a familiar flying site.

## Preparation for launch

Following a consistent method of preparation and pre-flight checks is vital for safe flying. We recommend the following:

- ✓ On arrival at the flying site, assess the suitability of the conditions: wind speed and direction, airspace, turbulence and thermal cycles.
- ✓ Inspect your glider, harness, reserve handle and pin, helmet and any other equipment.
- ✓ Choose a sufficiently large take-off area with even ground and no obstacles.
- ✓ Secure yourself in your harness and don't forget the leg loops! Put your helmet on.
- ✓ Lay the glider out according to the plan form, and get the lines and risers sorted out.
- ✓ Connect the risers to your harness carabiners, ensuring there are no twists or loops around the lines.
- ✓ Connect the speed system to the risers with the Brummel hooks.
- ✓ Do a final line check by pulling gently on the risers or lines to ensure there are no new knots, tangles or interfering branches or rocks. Take extra care in nil or light winds.

## Pre-flight check list

- ✓ Reserve parachute: pin in and handle secure
- ✓ Helmet and harness buckles closed
- ✓ Lines free
- ✓ Canopy open and into wind
- ✓ Airspace clear

## Additional Checks for flying with paramotor:

- ✓ Engine warm and delivering full power?
- ✓ Karabiners and shackles closed and secure?
- ✓ Trimmer setting correct and symmetric?
- ✓ Propeller free – nothing can get caught by the propeller?
- ✓ Speed system functioning – enough clearance from the motor?
- ✓ All lines free? Throttle handle and break lines not twisted?
- ✓ Pilot ready to go, no lose parts on the clothing or harness?
- ✓ Visibility ok?

## First flights with paramotor

First try to get accustomed to the Bolero 4. You should make your first flights with trimmers set to the neutral position. When you fly the Bolero 4 in this trimmer position it feels like a normal paraglider. Apply normal brake pressure and try to find the point where the pressure becomes heavier. This point will be at around 25% of the total brake travel range.

When you are used to flying with the Bolero 4 in this trimmer position try to fly with the trimmers set to faster and slower positions, use weight shift for flying turns and use the accelerator. Enjoy the additional speed and safety of the Bolero 4 (also see the riser drawings on page 8 of this manual for additional, more detailed information).

**Important advice: Make sure that the clamp of the trimmers has a tight grip by pulling the trim adjuster strap in the opposite direction. This helps, that the teeth of the trimmer clamp get a good grip in the webbing material and stay locked in this position.**

### Double check the lengths of the brake line

As already mentioned earlier it is better to use the advice and help of a paramotor instructor or a experienced paramotor pilot. Chose a day with steady wind of around 15-20 km/h and check the brake line length with your motor on the back.

## Take off without motor

The key to a successful launch technique is to practice ground handling on flat ground whenever you can.

### Light or Nil Wind Launch

The Bolero 4 inflates steadily in nil-wind conditions. Simply guide the glider with the A-risers, keeping your arms bent and hands at the level of the shoulders. Allow your arms to rise in an arc and wait for the glider to inflate and come above your head – do not push the risers. **There is no need to pull the risers hard.** Run positively as the glider comes above your head. Be sure to look up and **check that the canopy is fully inflated before you take-off**, and that there are no tangles in the lines. If any irregularity should occur and you're not yet airborne, abort the launch immediately by stalling the glider. On steep launches, stall one side of the glider and run parallel to the hill.

If the glider should come up sideways, and the situation is recoverable, run towards the lower side rather than trying to struggle against the force.

An impulse launch where you start running with slack lines close to the glider is not needed.

### Strong Wind Launch

The reverse launch technique is recommended. Holding the brakes, turn around to face the wing passing one set of risers over your head as you turn. We suggest building a "wall" by partially inflating your glider on the ground, thus sorting lines out thoroughly. Check the airspace is clear and gently pull the glider up with the A risers. When the glider is overhead, check it gently with the brakes,

turn and launch. In stronger winds, be prepared to take a couple of steps towards the glider as it inflates and rises.

## Line knots or tangles

If you do take off with a line knot or tangle, try to get clear of the ground and any traffic before taking corrective action. Weight shift and/or counter brake to the opposite side and pump the knotted side with your brake. Be careful not to fly too slowly to avoid a stall or spin. If the knot or tangle is too tight to pump out, immediately fly to the landing zone and land safely.

## Min Sink / best glide

The minimum sink speed is achieved by pulling approximately 30 cm of brake. The theoretical best glide speed in calm air is realized at the hands-off position.

## Accelerated flight

Once you have become accustomed to flying the Bolero 4, you can practice using the speed system, which allows improved glide in headwinds and greater penetration in strong winds.

Apply the speed system by pushing the speed bar progressively with your feet. Be prepared to control roll by using weightshift and pitch by varying the amount of bar. Keep a very light pressure on the brakes in order to feel the canopy.

Avoid flying accelerated near the ground, and don't use more than half the maximum travel in turbulence.

If you do encounter a collapse while using the accelerator, step off the bar first before taking any other corrective actions.

## Active Flying

The Bolero 4 has a high internal pressure, resistance to tucking and a very high degree of passive safety. However, it is recommended that at this stage you already start practising an active flying style. This will help you avoid deflations in all but the most turbulent conditions. The key to active piloting is keeping the glider above your head at all times. If it falls back behind you, let up the brakes. If it surges in front of you, counter brake until the surge is controlled. If you sense a loss of pressure on one side of the canopy, smoothly apply brake and/or weightshift on the appropriate side until you feel pressure return. In all cases, maintain adequate airspeed and avoid overreaction.

## In turbulence

Deflations of the canopy can occur in strong turbulence. The Bolero 4 will recover without pilot input in almost all situations, so whenever in doubt, let up the brakes and let the glider fly. However, it is recommended that you follow the advice below in order to help the wing recover more rapidly.

### Asymmetric deflation

In the event of encountering strong turbulence and suffering an asymmetric deflation (collapse on one side), the Bolero 4 will promptly and easily re-inflate without interference from the pilot, but the course might alter slightly. This might be unwanted close to the ground or other gliders. Maintain your course by weightshifting away from the collapsed side. This action can be aided by applying a little force on the brake opposite to the deflation. This will normally be sufficient. However, if the

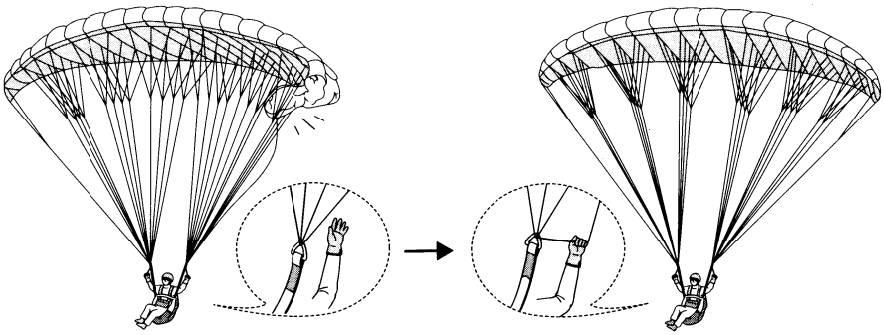
deflation fails to come out, pump the deflated side with a firm and smooth pumping motion. Let the glider regain its flying speed after it has re-inflated.

### Symmetric deflation

A symmetric (frontal) deflation will come out promptly without pilot input. The glider will regain airspeed with a small surge. If counter braking, be careful not to over-correct.

### Cravat / glider wrapped around lines

A cravat occurs after a severe deflation when the wingtip becomes trapped in the glider lines. It is extremely unlikely to occur on the Bolero 4. Nevertheless, the pilot should be familiar with the procedure for correcting it. Counterbrake and/or weightshift and pump the brake on the tangled side. On all Gin gliders, there is a separate stabilizer/winglet main line. On the Bolero 4 it goes down to the B riser. This line usually comes slack in the event of a cravat. Pull it down completely until it comes tight and the cravat normally comes out.




## Cascade of events

Many reserve deployments are a result of a cascade of over-corrections by the pilot. Please note that over-corrections are often worse than no input at all.

### Flat spin

In normal thermalling flight, you are very far from the limits of a flat spin. Nevertheless, should this occur, just let up the brakes and wait for the glider to surge forward.

### Full stall, dynamic stall

This is an extreme manoeuvre and there should never be any need to perform one.

Do not take wraps with your brakes before entering a full stall. Keep your hands close to your body during the stall, and lock them under your harness seat plate if necessary. In a stable full stall, the canopy will oscillate back and forth. Before releasing the stall, raise your hands slightly and evenly to fill the glider with air. If possible, let the brakes up when the glider is in front of you to avoid excessive surge. The Bolero 4 will slow down the surge on its own, but you may counter brake the dive

briefly for comfort if needed and then let up the brakes to regain airspeed. Be careful to not stall the glider again when damping the surge.

Never attempt a stall and then change your mind and release the brakes, as the glider will surge radically.

### Deep stall (parachuting, stable stall)

The Bolero 4 does not have a tendency to get into nor stay in a deep stall. Should this nevertheless occur, put your hands on the A risers and push forward to gain speed. On some modern harness/accelerator setups, you can reach the speedbar without using your hands. If so, push the speedbar. Never try to steer out of a deep stall.

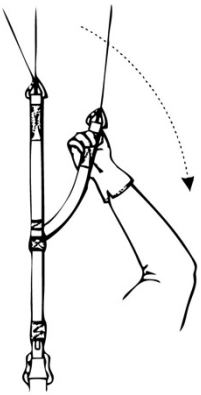
You can recognise a deep stall by the glider getting "mushy" and the airflow around your ears decreasing. This situation is usually achieved by flying in turbulence or exiting a deflation with too much brakes applied.

## Losing altitude

Extremely strong and widespread lift is found, for example, in storm conditions. The best place to be in this situation is on the ground. Nevertheless, if you've been caught out by the weather and find yourself needing to descend rapidly, there are several ways to do so. The best way is, of course, to find sink. Failing that, try one of the techniques below. They are presented in order, from the least to the most extreme. Most of these techniques place undue stress on your glider, and should be avoided if your wish to extend its lifetime. We recommend you initially practice these manoeuvres under qualified supervision during a safety training course.

### Big ears

Big ears is a safe method of moderately losing altitude while maintaining some forward speed. To make big ears, pull the outer "A" riser which is connected to the outer line of each side. Simply pull this separated "A" riser outwards and downwards as shown.



Although the noise of the wind around your ears may indicate the airspeed improves, the airspeed does not improve with big ears. You may use the speedbar in combination with big ears to maintain your forward speed but increase the sink.

The glider can be steered while in big ears using weightshift alone.

When releasing the lines, the Bolero 4's ears will come out on their own. Release the big ears at least 100m above the ground. If this is not possible, keep the big ears in until you flare for landing rather than letting them out on the approach. This is a safer method because of a possible wind gradient close to the ground and your low airspeed/high wing loading with big ears in.

### Spiral dive

The spiral dive should be considered an extreme manoeuvre. Practice spiralling with caution and lesser sink rates to get a feel for the Bolero 4's behaviour. Weightshift and pull the brake on one side gradually. Let it accelerate for two turns and you will enter the spiral dive. Once in the spiral, you can control your descent rate and bank angle with weight shift and the outer brake.

WARNING! A pilot who is dehydrated and/or not accustomed to spiralling can lose consciousness in a steep spiral dive! As with all types of aircraft, we advise you to assist the glider to exit from the spiral dive in a controlled manner. Let the glider decelerate for one or two turns by applying outer brake and/or weight shift.

### B-stall

To quickly lose altitude without straining your body with G-force you can use the B-stall. Reach up to the B-risers just below the maillons and twist your hands while gently pulling. It will be difficult at first, but become lighter the more you break the aerofoil. Once pulled, do not release immediately. The glider needs to settle into a stable B-stall before releasing. On exiting the B-stall the Bolero 4 has a very gentle dive without deep stall tendencies. We advise you to release the B-stall symmetrically with both hands in a decided manner.

## Steering without brakes

If a brake is not operational for some reason, you can steer the Bolero 4 with the D-risers. Add steering input by weight-shifting in your harness. Be careful not to steer too much with the riser to avoid any possibility of a spin.

## Aerobatics

The Bolero 4 is not designed for aerobatics. Besides the inherent risks, extreme manoeuvres of any kind place unnecessary stress on the glider and effectively shorten its lifespan.

## Landing with the Bolero 4

Select a familiar landing area free of obstacles and carefully note the wind speed and direction in the landing area. The low minimum flying speed of the Bolero4 will help you to make a soft landing in all conditions. Approach the landing with sufficient airspeed and don't leave your last turn too late or too steep.

Before landing, slide your legs forward in the harness so that you adopt the standing position. NEVER land in the seated position; it is very dangerous for your back even if you have back protection, which

is only a passive safety system. Standing up before landing is an active safety system, and is much more effective.

## Tow launch

The Bolero 4 is suitable for towing by pilots who have the relevant towing certification. The Bolero 4 has no tendencies towards deep stall/parachuting. There is sufficient margin to counter steer the glider in a normal towing situation. Make sure you use proper equipment, experienced personnel, the recommended techniques and all relevant safety precautions for towing.

## Flying under Power

NOTE: Thorough pre-flight checks of the glider, harness and engine are essential prior to any launch. For powered flight, many of the flying characteristics of the Bolero 4 are the same as in the previous section; however, there is a certain amount of additional information, particularly where the addition of the thrust of the power unit and correct matching of the wing to the motor unit is concerned. Gin Gliders cannot be held responsible for ensuring full compatibility with the multitude of motor units that could be used.

### Forward Launching in Nil Wind

While there may appear to be no wind, this is rarely the case and it is essential for aircraft of this type to take off and make the initial climb out to a safe height (depending on the surrounding terrain) into wind. This makes maximum use of the wind and avoids the danger of losing airspeed when climbing out steeply through wind gradient. Particular attention must be paid to trees, power lines and other large obstacles and any rotor that they may generate.

### Preparing the wing:

Lay the glider out, downwind of the motor, so that the lines are fully extended and as if attracted to the central focal point of the motor. Then lay the risers down ready to clip in. Set the trimmers to the take off position (Faster settings may be desirable in stronger conditions, see the diagrams on page 8). Make sure that when warming up the engine you do so upwind of the wing and then stop it whilst clipping in.

Attach the glider and proceed with the launch (as in section Launching).

From now on you should try to control the glider whilst facing forwards. If the wing is low behind you and you turn around, the lines will trail over the propeller. However, falling backwards onto the motor is both dangerous and expensive and must be avoided at all costs, even if that means a few damaged lines!

During the launch, if the pressures on each of your hands feels even, open the throttle to full take off power, leaning backwards against the thrust so that the engine is pushing you along the ground rather than into it.

It is best to try and leave the brakes alone and just let the canopy come up. If it starts to go off to one side, increase the pressure on the riser on the lower side, whilst moving sideways towards it and the centre of the wing. Where possible maintain the direction of your launch.

If the wing starts to drop backwards, increase the pressure on both "A" risers to help it up, and as you increase power, try to keep a constant angle with the motor and maintain smooth power control. Any sudden changes will alter your course because of the powerful gyroscopic and torque effects.

If the canopy is so far off to the side or behind that it cannot be recovered, kill the engine, abort the take-off and reassess the launch conditions.

As the canopy comes up, the drag reduces and it should stabilize over your head without overshooting you. This is a good time to check that your wing is nicely inflated and that there are no tangles or lines fouled, but this must be done whilst on the move andwithout turning. When you feel the resistance reduce, accelerate your run. Feel for pressure on the brakes, coming down on them as required to steer or to increase lift for taking off.

### Points to note:

* If your propeller protection cage is flimsy enough, the pressure of the lines on it during launch may distort it to the point where itfouls the prop. If this is the case make sure the lines have cleared the cage before you open the throttle.

* All control inputs should be smooth and progressive.

* Don't attempt to take off if the canopy isn't roughly level overhead. Dangerous oscillations may result if you apply full power with it too far off to one side.

* Keep your undercarriage down until you are definitely flying!

* The faster the trim setting, the more brake the glider will need to get off the ground.

### Reverse Launching in Stronger Winds

Because the Bolero 4 launches so easily it is possible to perform a reverse launch with both front risers and one brake in one hand and the throttle and opposite brake in the other. If the wind is appreciable this is the easiest method of launching, but if the wind is light the difficulty of running backwards safely with a motor on makes a forward launch preferable.

Having started and warmed up your motor upwind of the canopy, attach yourself to the power unit, face the canopy, approach the risers and clip them on to the appropriate mallions. Build a wall first using front and rear risers simultaneously. We recommendthat you momentarily raise the glider off the ground to check for tangles and line snags.

Holding risers, brakes and throttle control as outlined above, pull the front risers up to lift the glider over your head.

When the glider is steady above you turn round, apply power and take off.

As with forward launching, the trim/power/brake relationship must be established for the best rate of climb and forward speed.

### Points to Note:

*This is a cross-hands reverse launch. You must master this technique before attempting it under power.

Your local paragliding school can assist you here.

* All control inputs should be smooth and progressive.

* Don't attempt to take off if the canopy isn't roughly level overhead.

Dangerous oscillations may result if you apply full power with the canopy off to one side.

* Keep your undercarriage down until you are definitely flying!

* The faster the trim setting, the more brake the glider will need to get off the ground.

Speed systems may cause problems when clipping in. Don't get your lines crossed!

## The Climb Out

Once off the ground and flying safely, continue into wind using the brakes to achieve the desired climb rate. Don't attempt to climb at too steep an angle. Attempting to use too much brake to force a higher climb rate will only degrade the climb by creating extra drag and with the addition of lots of thrust this could result in a stall or a spin.

Under power the Bolero 4 behaves more like a powered fixed wing airplane than a paraglider, and it helps to think of it as such.

Provided there are no obstacles in your path, it is often safer to fly level with the ground after take-off gaining more speed before converting it into height using the brakes and then easing off into the climb out.

The other reasons for not climbing out too steeply are the risks involved when having engine failure, i.e. a stall and diving recovery.

Although the Bolero 4 will not sit back behind you a slow forward speed and high angle of attack is still likely to put you into a near stalled attitude if your power source suddenly fails. In this situation you should always be able to set up a reasonable approach, so maintain sufficient airspeed at all times, and keep your angle of attack under control at low altitude.

Depending on the geometry of the set-up of your power unit, the propeller's torque effect may make itself felt as you leave theground. Expect it to turn you and, if necessary, steer against it in order to maintain your direction. However, when countering the torque effect during a steep climb on slower trim settings under a lot of power, care must be taken to avoid the risk of stalling.

Because of the large vertical distance between the thrust line of the prop and the wing common to all paramotors, the extent of the power management required is critically dependent on your set up and flying ability.

## Power induced Oscillations

Certain combinations of weight, power, and propeller size can cause oscillation where the torque and gyro effects lift the pilot to one side; you then drop back only to swing up again. To counter this you can do one or more of the following:

* Alter the throttle setting

* Adjust the torque strap if fitted

* Shift your weight in the harness

* Adjust the trimmers to dampen it out

Weight shift is the best counter. Oscillation usually occurs on high power settings - more power and a larger propeller cause more oscillation. It could be that your control inputs are amplifying the oscillation. In this case, throttling back a little and flying hands-off should take care of the problem.

Having said all this, it is quite common for inexperienced pilots to be too busy on the controls, this is referred to as pilot induced oscillation, and the simple answer is stop moving your hands

## Level Flight

On reaching a safe height after takeoff, and if you wish to go cruising, turn on to your chosen heading, reach up and release thetrimmers if on a slow setting and if you like, and you have sufficient height, let go of the brakes completely. If conditions are very rough you may wish to keep hold of them, however the Bolero 4 is even more stable at higher speeds, so we suggest you let go and enjoy the flight.

Note – all motor units should have adequate netting to prevent toggles entering propellers whilst in flight – check yours!

If you have one, keep an eye on your alti/vario. In level flight - it is easy to creep into a climb without noticing. Use the information from your instruments to optimize your forward speed and reduce drag and fuel consumption. This will be specific to your own set-up. With its hands-off flight capability, the Bolero 4 is good at letting you do this.

With a sound understanding of the current wind conditions at different altitudes and intelligent use of any thermal activity, wave, convergence, ridge or frontal lift it is possible to conserve your fuel and greatly extend your operating range. The engine of course makes it easy to put you in the right place at the right time to exploit the conditions. Don't be afraid to throw the Bolero 4 into a tight thermal to gain height and save fuel - you will find it is particularly good at coring thermals. Using slower trim settings willallow you to climb faster in thermals.

## Using the Trimmers and Speed Bar

The Bolero 4 has a wide range oftrim and speed bar settings for you to explore. We recommend that you explore the full flight envelope at a safe height and with adequate training and experience.

The Bolero 4 has a wide and relatively safe speed range compared with most aircraft.

On faster trim or speed bar settings, brake pressures generally increase and weight-shift becomes more effective. On the slower settings, sink rate improves and handling becomes lighter, enabling you to make best use of thermal cores whilst giving you an improved climb rate and shorter slower take-offs and landings. For correct usage, first study the diagrams on page 8, showing trim and speed bar movement as well as speed bar hook-ups. The diagrams also show you the effect on the wing shape relative to the different settings.

At all speed settings the differential application of both brakes while banking allows you to make very effective turns by increasing the lift to assist the turn when the lift axis is canted over in the bank. Likewise engine thrust and speed bar can be applied at certain times to increase turn rate etc. These techniques come with more experience allowing you to get the most fromyour wing you to achieve

fully coordinated, smooth turns, much like those possible on a three axis aircraft.

### Points to Note:-

* Remember, the trimmers and speed bar controls are extra items for your pre-flight checks!

## Landing

There generally seems to be two philosophies about landing a paramotor - either with or without power.

### Power-off Landings

Cut all power at about 50m and glide in like a paraglider.

This minimizes the risk of propeller damage but you only get one go at it - you have to get it right!

With or without power the Bolero 4 rides out turbulence much better on a fast trim setting, so if it is rough come in fast, allow yourself plenty of room and bleed off speed before you touch down. The Bolero 4 stores energy quite well and it may be necessary to round out and 'float' level with the ground, converting your excess speed into lift while you slow down, before flaring to touchdown.

If you aim at a precision or tight landing, or in nil-wind conditions, it is advisable to use half or even full trim (maximum lift configuration).

This will hardly alter your glide angle but will decrease your sink rate; these decisions become more critical at higher wing loadings.

### Power-on Landings

At a steady tick over, lose height at a shallow angle, then, as you near the ground, level out and bleed off speed before flaring to touch down. Kill the motor as your feet touch the ground. The advantage of this method is that if you get it wrong you can power up and go round again at any time. The disadvantages are the increased risk of (expensive) prop damage if you get it wrong and the dangers involved in falling over with the engine running and getting your lines in the propeller if you forget to switch off before the wing deflates.

### Points to note:

* If possible, know all about your landing area before you take off.
* Check the wind direction before you set up your approach.
* Power-off landings probably need less space.
* If in doubt, practice your approach until you are sure you can land safely.

## Advanced manoeuvres

It is essential that pilots take proper training before attempting certain manoeuvres.

We also suggest that you seek advice from instructors or experienced pilots before conducting ANY of these manoeuvres or go flying in extreme conditions, and that you carry a reserve parachute.

### During take-off

ALWAYS ensure that your wing is definitely flying with enough air speed, before opening the throttle or pulling on any brakes during any launch. If it does happen that you have managed to leave the ground but are not fully flying, DO NOT add more power and more brakes but smoothly come off them, If the wing does not accelerate, just land. Re-assess the conditions as it may well be you are trying to climb out through a wind gradient.

Remember: stalling is common to all aircraft that take off with insufficient air speed and then try to climb. The thrust line on a paramotor is well below the wing, so adding power adds to the problem.

## GOLDEN RULES!!!

* Never place your engine downwind of your wing.

* Check, check and re-check the fuel system for leaks.

* Have you enough fuel to get you there? Better too much than too little!

* Check for any loose articles that could trail or fall into the propeller while flying and fasten them securely.

* If you spot a problem, no matter how small, deal with it immediately!

* Always put on and fasten your helmet before clipping in to the harness.

* Always carry out full pre-flight checks before launching.

* Try to control the glider on the ground facing forwards so asto keep the lines out of the prop. You should only turn to face the glider to avoid falling backwards onto the motor.

* Don't fly into danger - over water, trees, power lines etc. where an engine failure will leave you in trouble.

* Try not to fly into the turbulence of your own wake or that of others, especially at low altitude.

* It is unwise to fly hands-off below about 100m. AGL. As an engine failure below this height may require you to make immediate control inputs to set up a landing approach.

* Never rely on the engine: it may cut out at any moment. Always fly as if it will, so fly the wing – NOT the motor

* Except for collision avoidance, making a sharp turn against the torque effect during steep climbs can be dangerous: you may rapidly stall and enter a spin.

* Avoid downwind low flying: it drastically reduces your options!

* Be sensitive to mechanical problems early. A noticeable change in engine tone or a new vibration may spell trouble. Land and check it out.

* Make sure your navigation is up to the job.

* Remember, not everyone enjoys your engine noise.

* Care must be taken when flying near livestock.

# 5. Care, Maintenance and Repairs

The materials used in the Bolero 4 have been carefully selected for maximum durability. Nevertheless, following the guidelines below will keep your paraglider airworthy and will ensure a long period of continuous safe operation. Excessive wear is caused by careless ground handling and packing, unnecessary exposure to UV light, chemicals, heat and moisture.

## Ground handling

The following should be avoided:

Violent shocks to the upper surface (e.g. when the canopy crashes to the ground leading edge first whilst ground handling).

Dragging the glider along the ground.

Stepping on the lines or canopy. The Kevlar inside the sheath can take lots of pulling force without stretching, but is sensitive to bending with small radius.

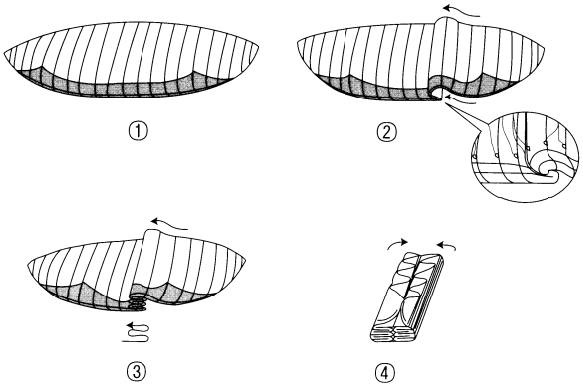
Opening your wing in strong winds without first untangling the lines.

## UV damage

Avoid leaving the glider out in the sun unnecessarily. UV rays from the sun degrade paraglider cloth.

## Packing instructions

We advise you to pack the glider 'accordion wise' as shown in the diagram. This packing procedure takes slightly longer and requires an assistant, but it conserves the rigidity in the profile reinforcements.




Since folding the glider weakens the materials, pack the glider as loosely as possible.

## Transport and Storage

Moisture is the worst enemy for your glider, adversely affecting the ageing of fabric, lines and reinforcements. The Bolero 4 should therefore be kept dry and cool. Do not pack the glider away for a prolonged period if it is damp, sandy, salty, or if other objects have entered the cells. Always allow it

to dry naturally before storage in a dry room. Leave the rucksack zip open whenever possible to allow residual moisture to evaporate, and do not transport or store the glider in the proximity of chemicals such as gasoline, paints or other solvents.

## Cleaning

Use only lukewarm water and a soft cloth to clean your wing. Never use any abrasive materials or detergents. Only clean the wing if it is absolutely necessary e.g. after a landing in salt water.

## Maintenance Inspections

The Bolero 4 must be fully inspected by an authorized Gin agent not later than 30 months after the first flight or after 200 flying hours, whichever is sooner. Subsequent full inspections should be done every 2 years or 200 flying hours, whichever is sooner.

The maintenance inspection instructions can be found in the manuals section on www.gingliders.com

A full inspection will give you peace of mind and extend your glider's lifetime. Additional inspections should be performed by a qualified person following a crash or violent landing on the leading edge, or if you note a deterioration of performance or behaviour.

You should also check for any damage to your lines, sail, and carabiners before each flight.

## Repairs

Very small holes in the sail can be repaired with the sticky back tape provided with your glider. Damaged lines should ideally be replaced by your GIN dealer. Before fitting a replacement line, check it for length against its counterpart on the other side of the wing. When a line has been replaced, always inflate the glider on flat ground to check that everything is in order before flying.

Major repairs, such as replacement panels, should only be carried out by the distributor or manufacturer.

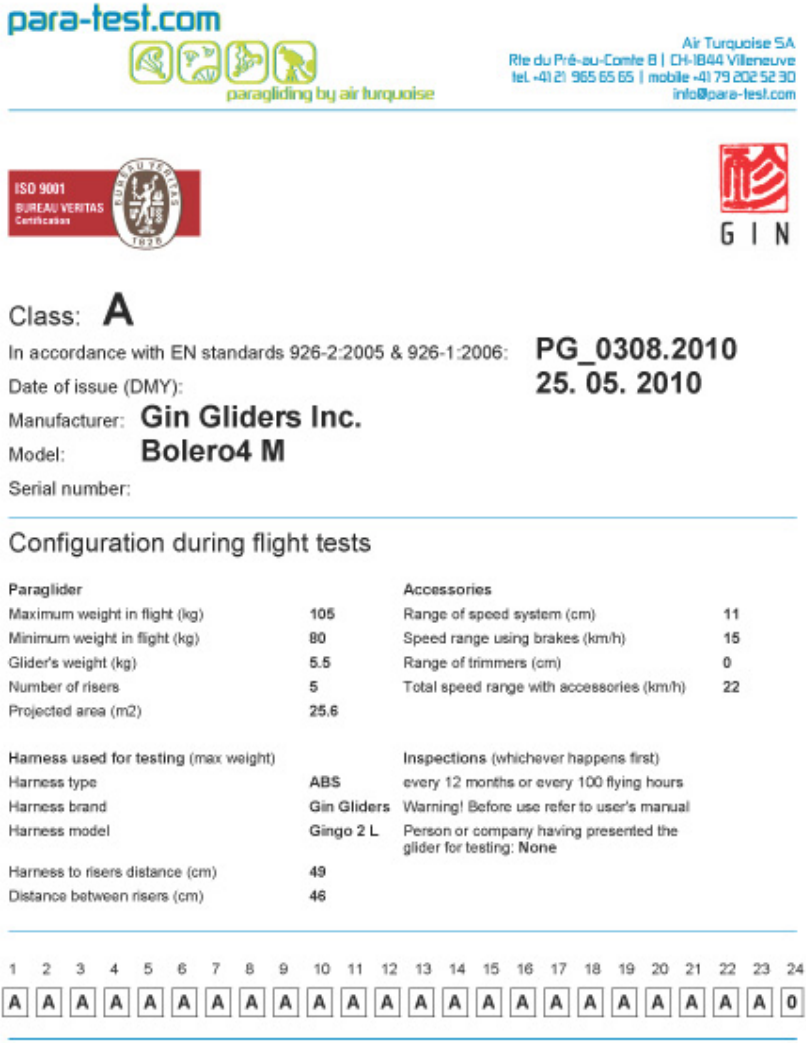
## Environmentally friendly disposal of the paraglider

GIN paragliders are manufactured with non-toxic materials that have been assessed for their environmental impact. When your Vantage has reached the end of its life after a number of years, please take care to dispose of it in an environmentally friendly manner. Please check with local authorities regarding the current regulations and disposal facilities in your area.

# 6. Reference

## Testing and Certification

The Gin Glider Bolero 4 has passed EN standard A and LTF A. This is the safest class of paraglider. The Bolero 4 has also passed load tests and shock tests with a load exceeding 8G of the maximum weight in flight.



para-test.com

paragliding by air turquoise

Air Turquoise SA
Rte du Pré-au-Comte 8 | CH-1844 Villeneuve
tel. +41 21 965 65 65 | mobile +41 79 202 52 30
info@para-test.com

ISO 9001 BUREAU VERITAS Certification

GIN

Class: **A**

In accordance with EN standards 926-2:2005 & 926-1:2006: **PG_0308.2010**

Date of issue (DMY): **25. 05. 2010**

Manufacturer: **Gin Gliders Inc.**

Model: **Bolero4 M**

Serial number:

Configuration during flight tests

| Paraglider | | Accessories | |
|---|---|---|---|
| Maximum weight in flight (kg) | 105 | Range of speed system (cm) | 11 |
| Minimum weight in flight (kg) | 80 | Speed range using brakes (km/h) | 15 |
| Glider's weight (kg) | 5.5 | Range of trimmers (cm) | 0 |
| Number of risers | 5 | Total speed range with accessories (km/h) | 22 |
| Projected area (m2) | 25.6 | | |

| Harness used for testing (max weight) | | Inspections (whichever happens first) |
|---|---|---|
| Harness type | ABS | every 12 months or every 100 flying hours |
| Harness brand | Gin Gliders | Warning! Before use refer to user's manual |
| Harness model | Gingo 2 L | Person or company having presented the glider for testing: None |
| Harness to risers distance (cm) | 49 | |
| Distance between risers (cm) | 46 | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | 0 |

ISO 9001 BUREAU VERITAS Certification

## Gleitschirm / Paraglider Bolero4 M

Prüf-Nr. / Test reference-No GS_0308.2010 Certifcation Date / Prüfungsdatum 25-05-2010

Angewandte Prüfrichtlinien/normen: Lufttüchtigkeitsanforderungen für GS
Testregulations/ Standards Applied:

Klasse / Class: A

Anzahl Sitze / Number of Seats: 1

Hersteller / Manufacturer Gin Gliders Inc.

Fluggewicht / Weight in flight (kg): 80-105

Musterprüfbescheinigung Erteilt An: Gin Gliders Inc.
Declaration Of Conformity Issued To:

Gerätegewicht / Weight of Glider (kg): 5.5

Serien- Nr:
Serial- No:

Projizierte Fläche / Projected Area (m2): 25.6

Conformity Checked By:
Stückeprüft Durch:

Monat / Jahr :
Month / Year :

Anzahl Tragegurte / Number of Risers: 5

Beschleuniger / Accelerator: ja/yes

Regelmässige Nachprüfung Nach:
Periodic Inspection After: every 12 months or every 100 flying hours

Trimmer / Trimmer: nein/no

Conformity tests according to **2. DV LuftGerPV §1, Nr. 7 c** standards carried out by: LBA anerkannte Prüfstelle für Hängegleiter und Gleitsegel
Angewandte Prüfrichtlinien / Normen durch:

para-test.de

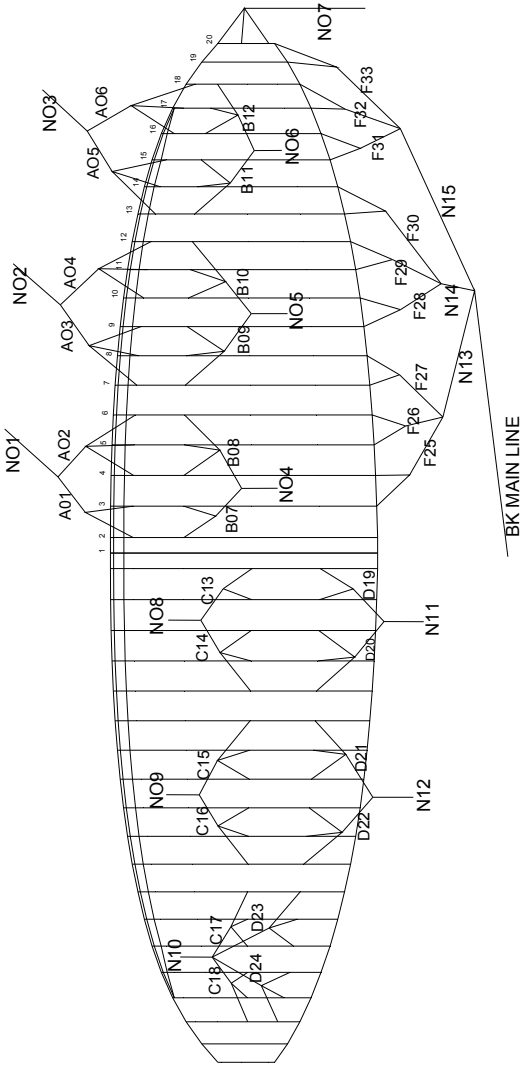
Air Turquoise SA
Rte du Pré-au-Compte 8 | CH-1844 Villeneuve
tel. +41 21 965 65 65 | mobile +41 79 202 52 30

Vor Gebrauch Betriebsanleitung lesen / Read instructions before use

## Technical Specifications

| SIZE | | XS | S | M | L | XL |
|---|---|---|---|---|---|---|
| FLAT | AREA | 24.2m² | 25.8m² | 28m² | 30.28m² | 32.66m² |
| | SPAN | 10.89m | 11.24m | 11.71m | 12.17m | 12.65m |
| | A.R | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| PROJECTED | AREA | 22.14m² | 23.59m² | 25.6m² | 27.68m² | 29.85m² |
| | SPAN | 9.17m | 9.46m | 9.86m | 10.25m | 10.65m |
| | A.R | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| CHORD | ROOT | 2.80m | 2.89m | 3.02m | 3.14m | 3.26m |
| | TIP | 0.59m | 0.61m | 0.64m | 0.66m | 0.69m |
| TOTAL HEIGHT | | 6.60m | 6.81m | 7.1m | 7.38m | 7.66m |
| CELL NUMBER | | 37 | 37 | 37 | 37 | 37 |
| GLIDER WEIGHT | | 4.5kg | 4.9kg | 5.4kg | 5.9kg | 6.4kg |
| WEIGHT IN FLIGHT | | 55-75kg | 70-85kg | 80~105kg | 95-120kg | 115~140kg |
| EN / LTF | | A | A | A | A | A |
| WEIGHT IN FLIGHT WITH PARAMOTOR | | --- | 92-112kg | 105-130kg | 112-140kg | --- |
| LTF (PARAMOTOR) | | --- | 23-05 | 23-05 | 23-05 | --- |

## Line Plan


NO7
F33
F32
F31
F30
F29
F28
F27
F26
F25
N15
N14
N13
BK MAIN LINE
NO3
AO6
AO5
B12
B11
NO6
NO2
AO4
AO3
B10
B09
NO5
NO1
AO2
A01
B08
B07
NO4
NO8
C13
C14
D19
N11
NO9
C15
C16
D21
D22
N12
N10
C17
C18
D23
D24

## DESCRIPTION

| | | |
|---|---|---|
| Model | | Bolero 4 |
| Fabric of Canopy | Top | Skytex 45/ Skytex 40 |
| | Bottom | Skytex40 |
| | Profile | Dokdo 30D FM |
| | Reinforcement | W420 |
| | Bridle | Nylon 12mm |
| Suspension Line | | Upper : LIROS DSL70<br>Middle : LIROSPPSL120, PPSL160<br>Main : GIN TGL280, TGL220 |
| Riser | | Guth& Wolf - Polyester 20mm |
| Maillons | | Stainless Steel 4.3mm |
| Thread | | HT Polyester Yarn 150D/3, 225D/3 |

*"Designing paragliders is a personal journey of challenge and discovery, an ongoing search for perfection."*

- Gin Seok Song

Every effort has been made to ensure that the information in this manual is correct, but please remember that it has been produced for guidance only. It should not be used as a "how to fly" manual.
This owner's manual is subject to changes without prior notice. Please check www.gingliders.com for the latest information regarding the Bolero and other GIN products.