12/04/17 (rev-10)

LIFT EU 400/450

LIFT EU II 400/450

Manual

APCO Aviation

Setting Future Standards

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CONTENTS:

WARNING

This is not a training manual. It is extremely dangerous to yourself and others to attempt to fly this or any paraglider without first completing a flying course given by a qualified instructor.

Apco Aviation's gliders are carefully manufactured and inspected by the factory. Please use the glider only as described in this manual. Do not make any changes to the glider.

AS WITH ANY SPORT - WITHOUT TAKING THE APPROPRIATE PRECAUTIONS, PARAGLIDING CAN BE DANGEROUS.

1 LIFT EU / EU II TECHNICAL DATA

Size	*400*	*450*
Cells	40	42
Area m²	39	42
Area (projected) m²	34.5	37.2
Span (incl. Stabiliser) m	13.8	14.6
Span (projected) m	11.52	12.2
Aspect Ratio	4.86	5.08
Aspect Ratio (projected)	3.83	4.00
Pilot Weight (all up + trike) Kg	160-300	230-400
Weight of Canopy Kg	8.4	9.3
Root Chord m	3.4	3.4
Tip Chord m	0.6	0.6
Length of Lines on B m	7.94	8.73
Total length of line used m	330	365

LINES			
	Material	**Diameter**	**Strength**
Top, St Top	Super Aramid	1.5mm	150kg
Mid	Super Aramid	1.8mm	230kg
Bottom A;B	Super Aramid	2.5mm	450kg
Bottom C; St	Super Aramid	1.9mm	320kg
Brake Cascades; StBr	Dyneema	1.1mm	95kg
Steering Line	Dyneema	2.3mm	230kg

FABRIC	
Sail Cloth	"Zero Porosity" Ripstop Nylon
Warranty	3 Years / 250 hours

GLIDER PERFORMANCE DATA	
V-min.	27km/h
V-trim (-) / V-trim (0)	41/46 km/h
V-trim off	55-60 km/h
V-max.	67+ km/h
Min Sink (at optimum wing loading)	1.3 m/s

2 DISCLAIMER OF LIABILITY

Taking into consideration the inherent risk in paragliding or hang gliding, (free flying and motorized), it must be expressly understood that the manufacturer and seller do not assume any responsibility for accidents, losses and direct or indirect damage following the use or misuse of this product.

APCO Aviation Ltd. is engaged in the manufacture and sale of hang gliding, paragliding, motorized Para/hang gliding and emergency parachute equipment.

This equipment should be used under proper conditions and after proper instruction from a qualified instructor. APCO Aviation Ltd. has no control over the use of this equipment and a person using this equipment assumes all risks of damage or injury.

APCO Aviation Ltd. disclaims any liability or responsibility for injuries or damages resulting from the use of this equipment.

The glider is designed to perform in the frame of the required class as certified.

3 CONSTRUCTION

The glider is constructed with a top and bottom surface, connected by ribs.

One top and bottom panel, together with the connecting ribs is called a cell.

Each cell has an opening on the front lower part. The cells fill with air forcing the panels to take the shape dictated by the airfoil (rib) section.
On either side the wing ends in a stabilizer or wing tip, which provides straight-line (Yaw) stability and produces some outward lift to keep the span-wise tension.

The front part of the ribs use APCO's FLEXON batten system to keep the leading edge shaped at high speeds and in turbulent air. They also improve the performance and the launch characteristics of the glider.

4 MATERIALS

The glider is made from tear resistant Ripstop Nylon cloth, which is P.U. coated to zero porosity and then siliconized to give the fabric high resistance to the elements. Different cloth is used for the top, bottom and ribs due to their different functions.
The lines are made of superaramid covered with a polyester sheath for protection against UV, wear and abrasion.

The bottom section of the brake lines are made of Dyneema because of its better mechanical properties.

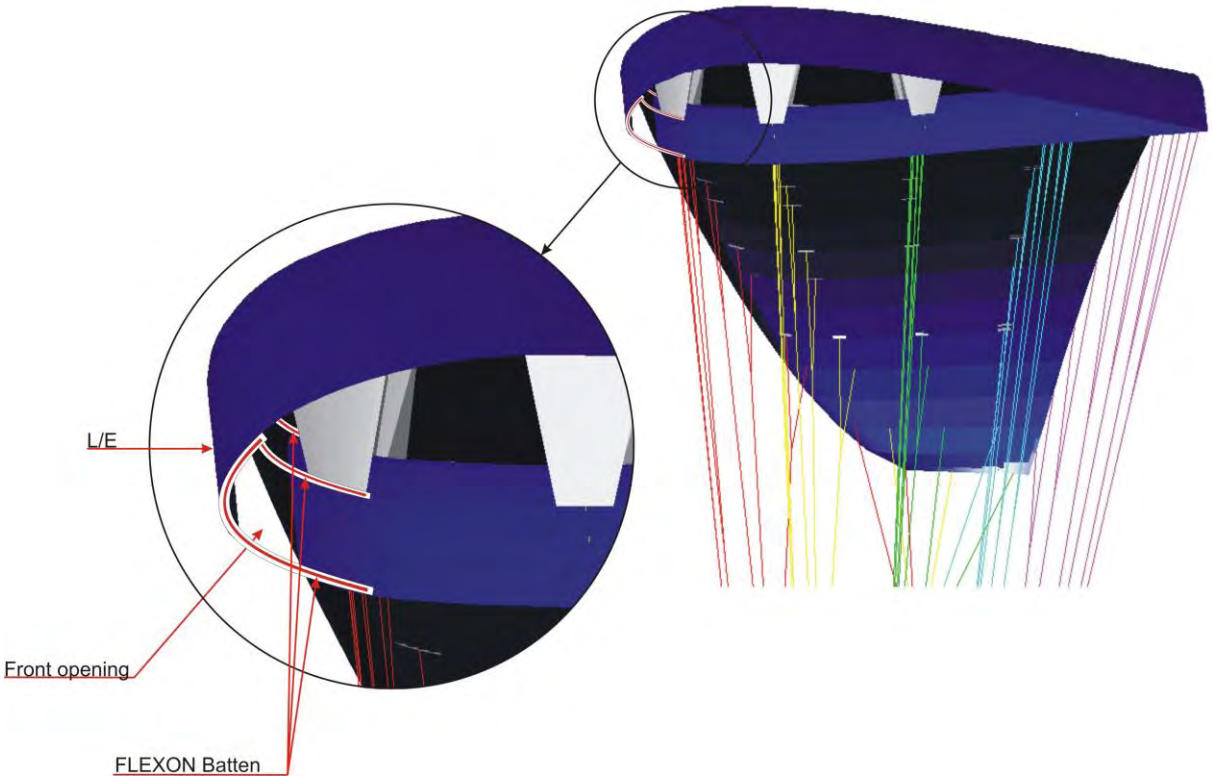
The maillon quick links that attach the lines to the risers are made of stainless steel.

5 FLEXON® Batten system:

New generation FLEXON ® batten system incorporated (see below) in the leading edge of the ribs, insuring perfect profile shape (instead of traditional Mylar reinforcement). FLEXON ® battens reduce the weight of the glider by an additional 500gr. and unlike Mylar reinforcement will guarantee no deterioration in performance or launch.

Additional advantage of the specific FLEXON batten material used by APCO is that it is practically indestructible, safeguarding the performance and launch over the lifespan of the glider.

How it Works:



6 TRIMMING

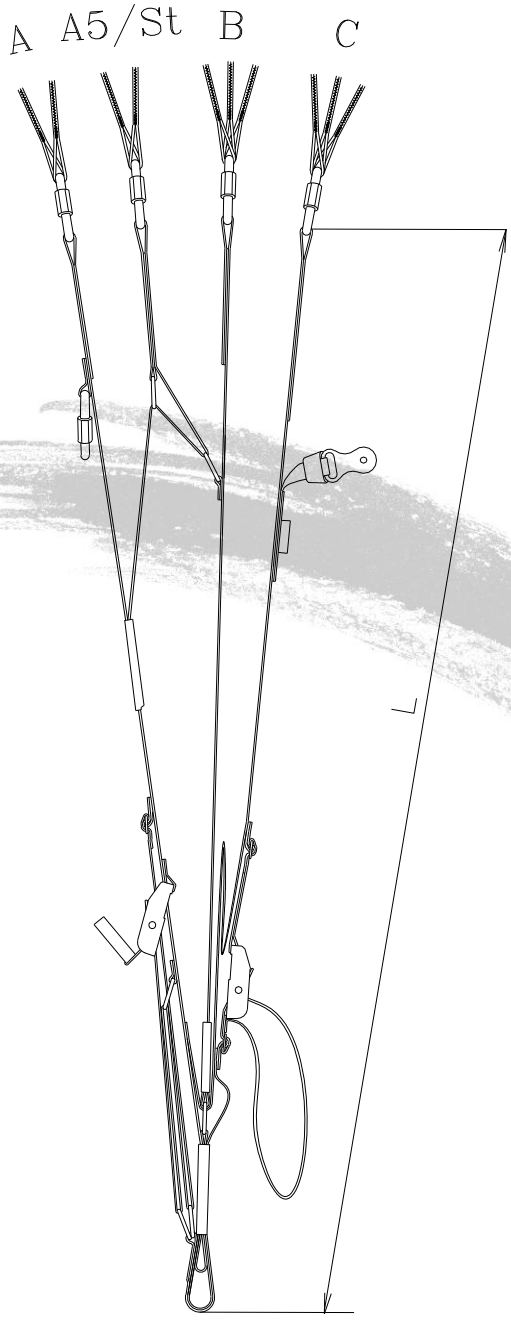
All Apco gliders are trimmed for optimum performance combined with unsurpassed safety. It is very important not to re-trim or tamper with any of the lines or risers as this may alter the performance and safety. Trimming of the brake line should be done in accordance with this manual and carefully checked before flying.

7 EMERGENCY PARACHUTE ATTACHMENT

It is recommended to use a certified rescue parachute when flying. Attaching the rescue parachute should be done in accordance with the recommendation of the harness and reserve parachute manufacturer, consulting the trike producer.

8 RISERS

The LIFT EU is supplied with risers featuring a split A riser. The 1st A-riser attaches to the central two A lines (A1 & A3). The second A-riser is attached to the outermost A line (A5, St). At no time should the pilot change the risers or use risers not intended for this specific glider as this will affect the performance and safety of the glider.
The riser is equipped with both front trimmer (serving as accelerator) and rear trimmers with two hook-in points to accommodate torque compensation for left and right prop rotation

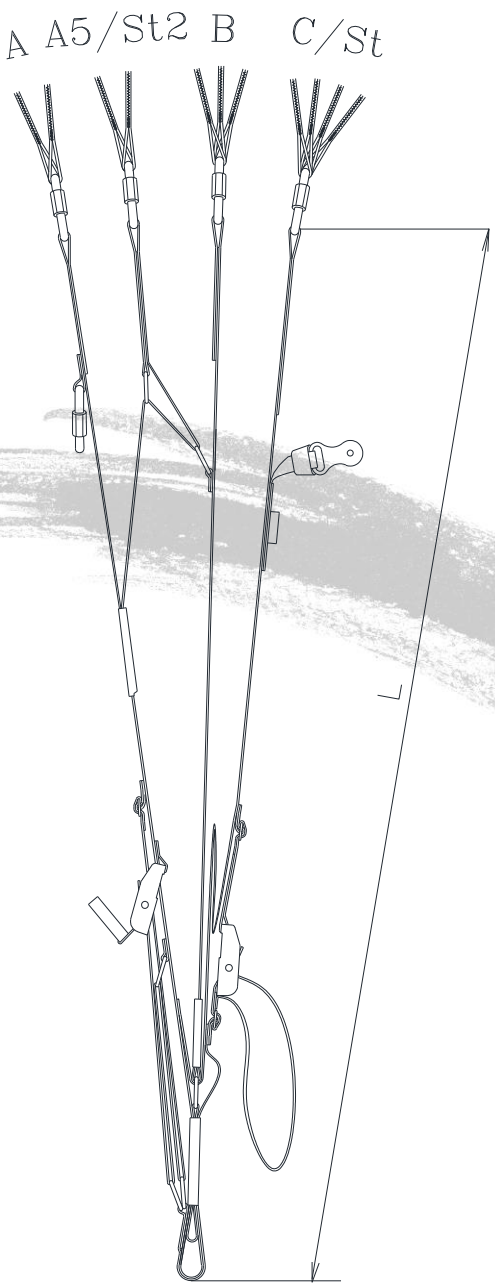


Length of risers L (Neutral Position L=530)

Connection to:	A1,3	A5,St	B	C
Front trim not activated trim down	400	400	400	370
Front trim not activated trim (0)	400	400	400	400
Front trim not activated trim up	400	400	400	470
Front trim activated trim (0)	375	390	400	425
Front trim activated trim up	375	390	400	495

* All measurements are in mm

Drawn by	Adam Wechsler	Part N 70075R/L	Toll	Quantity per glider 2
Date	28.06.15	Name		Drawing N
Scale		RISER		
Approved	Anatoly Cohn			
APCO Aviation LTD.		Product	LIFT 400/450 EU	

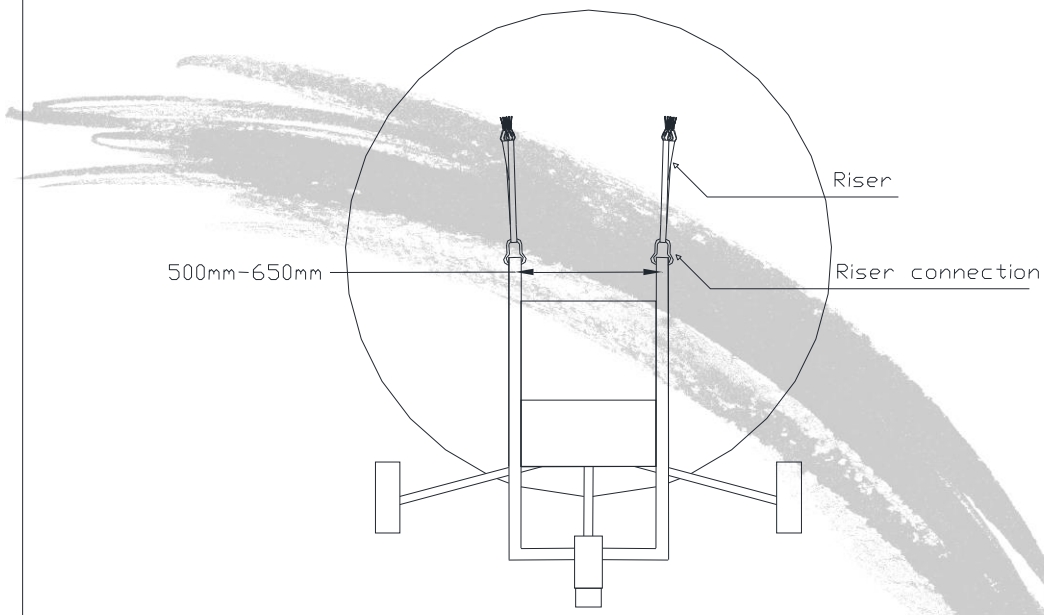


Length of risers L (Neutral Position L=530)

Connection to:	A1,3	A5,St	B	C
Front trim not activated trim down	400	400	400	370
Front trim not activated trim (0)	400	400	400	400
Front trim not activated trim up	400	400	400	470
Front trim activated trim (0)	340	380	400	425
Front trim activated trim up	340	380	400	495

* All measurements are in mm

Drawn by	Adam Wechsler	Part N 70075R/L	Toll	Quantity per glider 2
Date	11.12.16	Name RISER		Drawing N
Scale				
Approved	Anatoly Cohn			
APCO Aviation LTD.		Product LIFT EU II 400/450		



* For European style trikes with narrow spread hook in
* All measurements are in mm

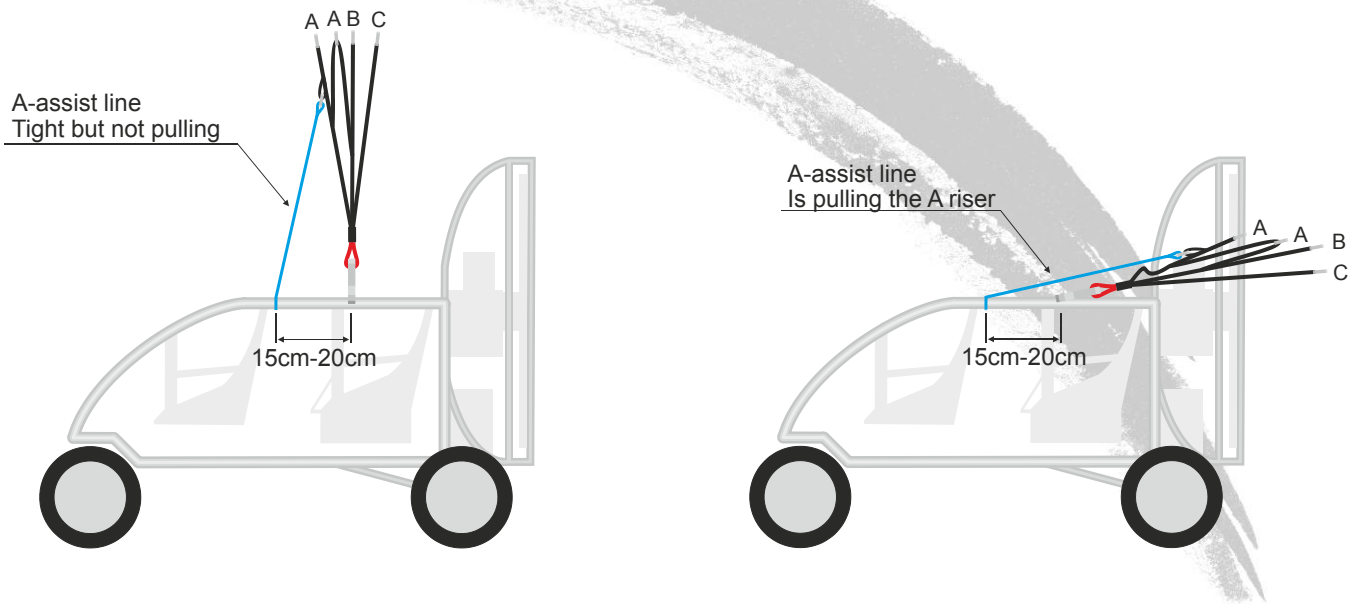
Drawn by Adam Wechsler	Part N	Toll ±10	
Date 27.07.15	Name Para Trike Wing Connection to Trike		Drawing N
Scale			
Approved Anatoly Cohn			
APCO Aviation LTD.	Product Applicable to all APCO tandem wings and wings designed for european style trikes		Revision 2

9 A ASSIST

The LIFT EU risers are equipped with A Assist connection (on the A risers).
The A Assist is a line that connects the A riser to a position at front of the frame,
This line is slightly shortening the A riser when the wing is behind the trike and therefore helps for the inflation.

ASSEMBLY INSTRUCTIONS FOR A-ASSIST:

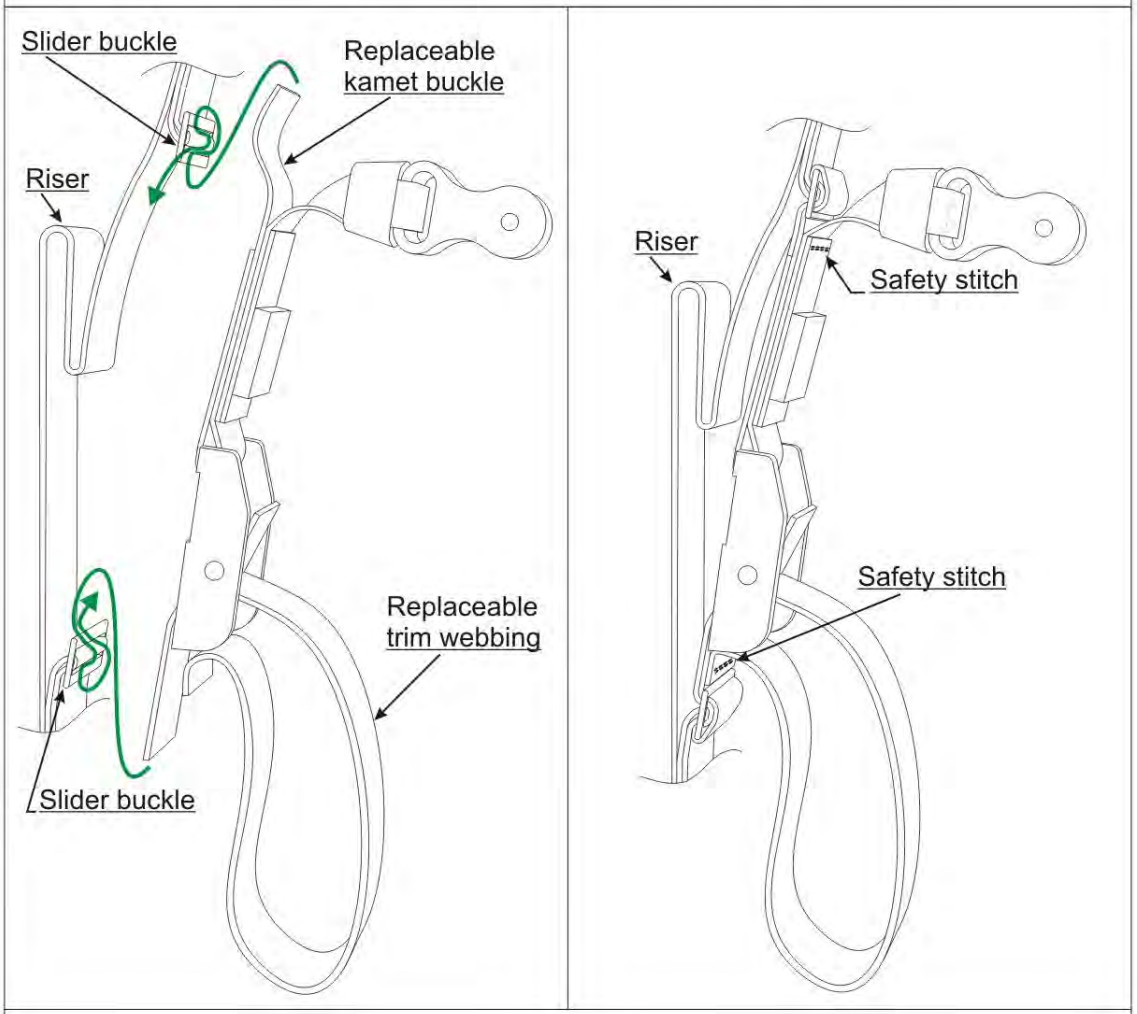
IN ORDER TO CORRECTLY ADJUST, CONNECT THE RISERS TO THE TRIKE, ADJUST THE FRONT TRIMMER TO
FULLY OPEN POSITION AND THE REAR TRIMMER TO THE NEUTRAL POSITION.
THEN CONNECT A-ASSIST LINE TO THE RISER, ANCHORING THE OTHER END TO THE TRIKE APPROX. 15-20 cm.
IN FRONT OF THE RISER.
MAKE SURE WHEN RISER IS IN FLIGHT POSITION (POINTING UPWARDS),
THAT THE A-ASSIST LINE IS TIGHT, BUT NOT PULLING DOWN THE A RISER.



10 REAR TRIMMERS

The LIFT EU risers are equipped with trimmers for accelerated flight. The neutral setting is when the A/B/C riser lengths are equal.
Trimmers should be used when higher speed is required and you wish to accelerate the glider. The trimmers and the webbing are replaceable if worn out.

Replaceable trimmer system



1. Undo the safety stitch of kamet or trim webbing, depending on what requires replacement.
2. Take out the kamet or trim webbing requiring replacement, by removing it from the slider buckle.
3. Replace trim webbing or kamet with new by guiding it back through the slider buckle, verify the trim range is unchanged, on trim speed all the riser branches are at equal height. When kamet fully released it should not retain any load (all the load is on the fully released D branch of the riser).
4. Restitch the safety stitch to lock the configuration of the trim in place.

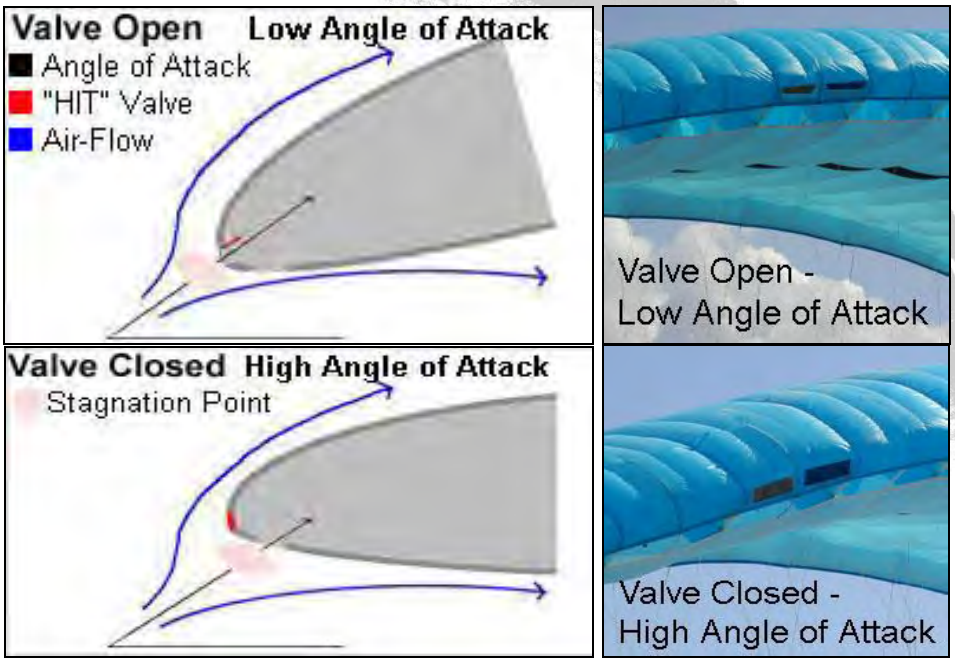
11 FRONT TRIMMERS

The LIFT EU risers are equipped with Front trimmers as well (used as a substitute for accelerator) for accelerated flight. The neutral setting is when the A/B/C riser lengths are equal.
Front Trimmers should be used when higher speed is required and you wish to accelerate the glider.
The Front Trimmers should be used only when the back Trimmers are fully open.

Caution:
When the wing is in accelerated mode (Rear and / or Front trimmer activated), steering should be done by stabilo steering only.

Do Not activate the Front Trimmers near the ground!!! Unlike Speed system it takes time to release the Front Trimmer and slow down the wing**.**
In an engine cut situation near the ground there will not be enough time to make the necessary steps to slow down the wing to a safe landing speed.

12 HIT VALVES (High speed In-Take)



The LIFT EU is equipped with an Active HIT Valve system (patent pending) to improve the overall performance and safety of the wing especially during accelerated flight.

The valve system allows maximum inflow of air when the glider acquires a lower angle of attack while accelerated. HIT valves open and close in flight to increase the internal pressure of the glider.

For the valves to work properly it is important to keep them wrinkle free especially in sub zero temperatures. Make sure the valves are lying flat and are in the closed position when you fold the glider. Before launch the pilot should check all the valves and verify that they are flat and cover the entire area of the mesh opening. Creased and wrinkled valves will not adversely affect the safety of the wing.

13 ABS - Automatic Balance System

Industry first, pioneered by APCO. ABS is a system which automatically and gradually pulls down the tips as you release the rear trimmers and pull Front trimmers.
This action stabilizes the wing , cancelling roll movement, "planting" the pilot under the center of the canopy.

The system operates automatically and there is no need for the pilot to activate it.

14 SRS – Stall Recovery System

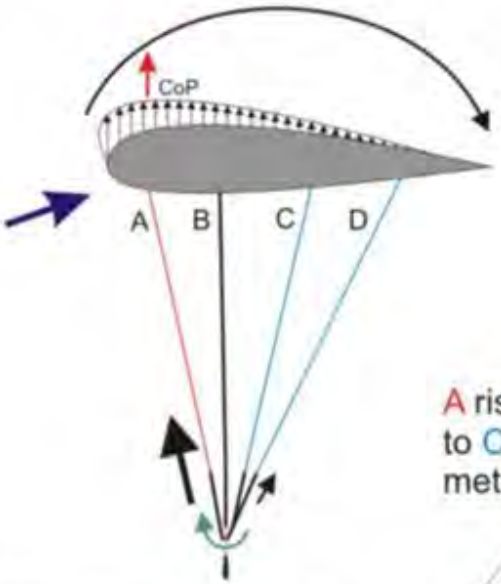
The **LIFT EU** features a new, innovative, riser design allowing to slow down the glider to minimum speed without risking getting caught in deep stall (parachutal). The **SRS** (patent pending) takes advantage of simple yet proven aeronautical and physical principles.

When flying, most of the load is applied to the front third of the wing. This means that the A lines bear significantly more load than the C+D lines together. However, when the glider is in deep stall (parachutal), the load is distributed almost evenly along the wing chord. Thus, in parachutal, the load on the C+D lines is considerably higher than on the A lines. Using this principle, we designed a self-compensating angle of attack (AofA) system based on a sliding riser concept.

The C+D riser join the A risers and slide in opposite direction. In flight, the A riser is tight and pulls the C+D to trim position. When forced into parachutal, The C+D riser elevate and pull down the A riser, accelerating the glider out of parachutal. Once recovered, the risers automatically resume trim position.

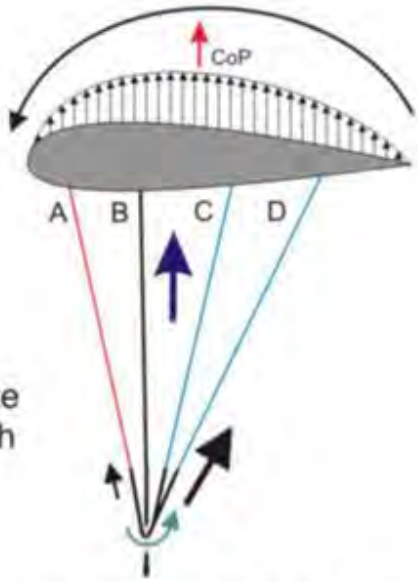
APCO SRS - Automatic Stall Recovery System

1



Load distribution in flight

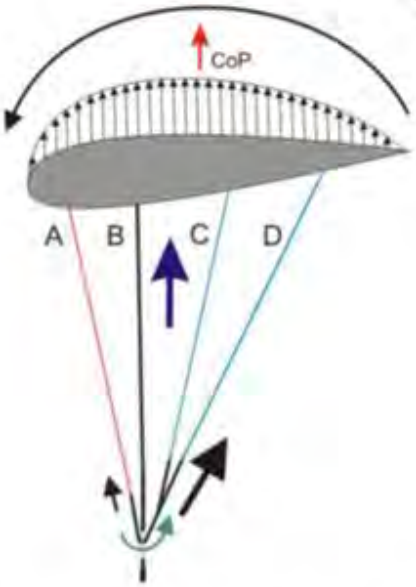
2



Load distribution in deep stall

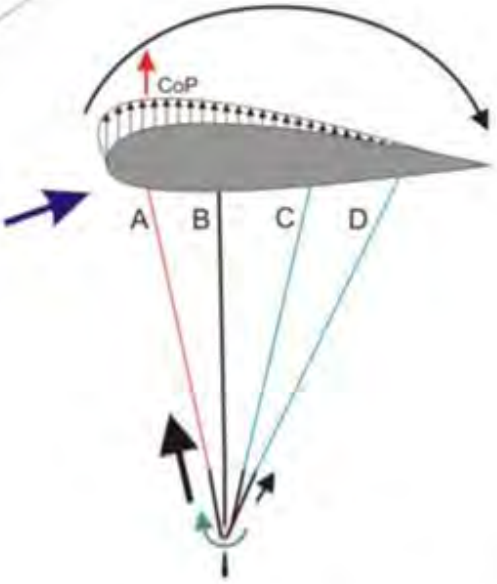
A riser slides opposite to C&D risers through metal loop.

3



Automatic compensation of SRS

4



Load distribution in flight

15 INSPECTION

15.1 GENERAL

Pilots, please insure that your glider has been test flown and fully checked by your dealer before taking it into your possession.
Verify that the dealer checked and confirms that the glider is airworthy.

In case of use of the wing in combination with trike:
Due to the very wide assortment of trikes on the market with different set up and design, it is necessary to verify that the specific trike can be successfully coupled with the wing.
Please make sure your dealer performs the following procedures before first flight:
A. It was checked with APCO that the specific trike can be flown with your new wing.
In case the specific combination is not checked by APCO – your dealer must take the following necessary steps :
B. Wing to be fully inspected by the dealer as in the paragraph above
C. Wing to be ground handled and visually checked while inflated.
D. Connection method to the trike is in line with APCO's recommendation according to the sketch in sections *8,9*. Pilot can reach both main brake handles and tip steering handles (if available).
E. Before first take-off perform "taxiing" test on the ground slowly rolling with the wing checking all aspects of the set-up without actually taking off. (including roll/yaw stability, pitch stability, stall tendency, brake response etc.)
F. Only once the wing passes the taxiing test – then the next step is to make the actual test flight to make sure trike and wing are correctly coupled and the system is airworthy.
G. Take the wing into your possession only after your dealer confirms that wing is airworthy when coupled with your trike.

15.2 BRAKE SETTING

Before the first flight the pilot/ dealer has to inflate the glider, check and adjust the brake line length to his or her preference. It is important that the brakes are not set too short. If the glider is above your head the brakes should not be pulling the trailing edge down as this means that the brakes are too short. A good setting is to have about 10 cm of slack in the brake from the brake guide on the riser to the activation point of the brakes (See Diagram 16-1 below). If the pilot changes the type of trike, please check the brakes again to ensure that the brakes are not too short.

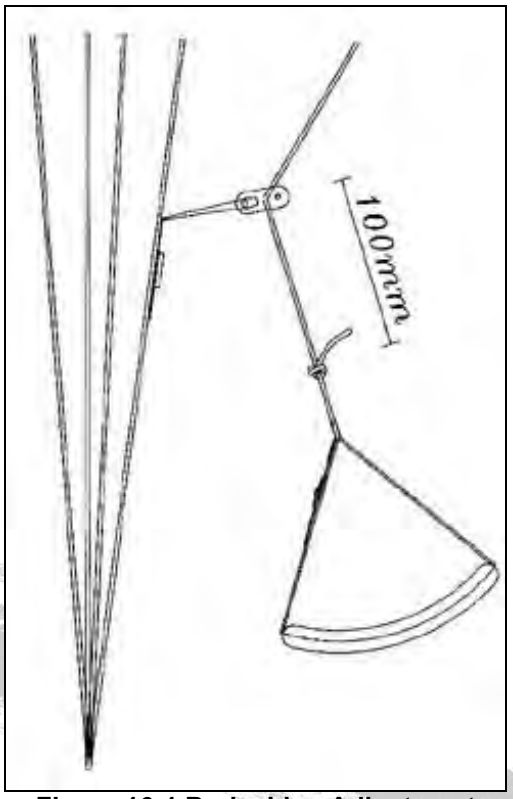


Figure 16-1 Brake Line Adjustment

15.3 FIRST CHECK AND PREFLIGHT INSPECTION

With every new wing, the following points should be checked:
• Connection points between the wing and the harness.
• Check that there are no lines twisted, tangled or knotted.
• Check that the risers and speed-system are hooked up to the harness correctly.

15.4 REGULAR INSPECTION CHECKS

• Damage to lines, webbing and thread on the stitching of the harness and risers.

• The stainless steel connection links on the risers are not damaged and are fully closed.

• The pulleys of the speed system are free to move and the lines are not twisted.

• The condition of the brake lines, stainless steel rings and the security of the knot attaching the brake handle to the brake line.

• The sewing and connection of the lines.

• Damage to hook up points on the wing.

• Internal damage to the ribs and diagonal ribs.

• Damage to the top and bottom panels and seams between panels.

15.5 LINE MAINTENANCE

Several groups of suspension lines and one brake line are attached to each riser. The groups are called A, B, C and brake lines. The stabilizer lines are connected along with the A-lines. Superaramid lines are known to be sensitive to the influence of the elements. They must be carefully inspected periodically. In his/her own interest, the pilot must observe the following points to ensure maximum performance and safety from the wing.

• Avoid sharp bending and squeezing of lines.
• Take care that people do not step on the lines.
• Do not pull or jerk the lines if they are caught on rocks or vegetation.
• Avoid getting the lines wet. If they do get wet, dry them as soon as possible at room temperature and never store them wet. Never fly with wet lines as their tensile strength will be temporarily reduced.

IT IS **STRICTLY RECOMMENDED** TO CHANGE THE BOTTOM LINES ON EVERY PARAGLIDER ONCE A YEAR OR EVERY 100 HOURS, WHICH EVER COMES FIRST. THE REST OF THE LINES MUST BE CHECKED YEARLY AND REPLACED IF NECESSARY.
THIS RECOMMENDATION IS IN LINE WITH ISRAELI REGULATIONS, BINDING IN ISRAEL ONLY.
AS AN ALTERNATIVE, WE SUGGEST FOR YOU TO FOLLOW THE REGULATIONS SET BY YOUR NATIONAL AUTHORITIES WITH REGARD TO LINE MAINTENANCE AND REPLACEMENT.
NEVER REPLACE THE LINES WITH DIFFERENT DIAMETER OR TYPE OF LINES AS ALL GLIDERS WERE LOAD TESTED FOR SAFETY IN THEIR ORIGINAL CONFIGURATION. CHANGING LINE DIAMETER/STRENGTHS CAN HAVE FATAL CONSEQUENCES.

According to Israeli regulations, every six months one of lower A, B and C line must be tested for minimum 45 % of the rated strength. If the line fails under the load test or does not return to its specified length all the corresponding lines must be replaced (e.g. if the line is rated 100 kg. it must withhold 45 kg. or more)
Professional use of wings: Towing, tandem, schooling and competition flying requires more frequent line inspection and replacement of A, B, C and brake lines.

16 *FLIGHT TECHNIQUES*

The LIFT EU is an easy and pleasant wing to fly.
It has excellent performance and can be enjoyed by a wide range of pilots.

16.1.1 FLYING SPEED

Indicated trim speed is dependant on the amount of brake the pilot is using, wing loading, altitude above sea level and the accuracy and make of speed probe. The speeds recorded in technical data were at optimum wing loading at sea level using a Flytec 6030 thus there could be a slight variation in speed range numbers that pilots records.

Speed readings in the flight reports could differ as this was measured during testing using various instruments and is an indication of the difference between trim, stall and top speed. The speed range will be the same but the actual numbers may differ.

• With 0% brake and trimmers at 0 the LIFT EU will fly at 45-46 km/h with a sink rate of 1.4m/s.
• When the trimmed down the wing will fly at 41-42km/h with minimum sink rate 1.3 m/s.
• With 80% brake the wing will fly at about 30km/h and will be close to the stall point 27km/h.

CAUTION:
APART FROM WHEN FLARING AT LANDING THERE SHOULD BE NO REASON TO FLY WITH 70% TO 100% BRAKE. THE SINK RATE OF THE WING WILL BE EXCESSIVE AND THERE WILL BE A POSSIBILITY OF ENTERING A DEEP STALL OR FULL STALL SITUATION. THERE IS ALSO THE RISK OF GOING NEGATIVE OR ENTERING A SPIN WHEN ATTEMPTING TO TURN THE WING NEAR THE STALL SPEED.

WARNING:
The use of the Front Trimmers in turbulent conditions or close to the ground is dangerous. While flying with the Front Trimmers pulled down, the wing has a reduced angle of attack and is therefore more susceptible to turbulence and may collapse or partially deflate. Wings react faster when accelerated and may turn more.

16.1.2 ASYMMETRIC COLLAPSE

If one side of the wing partially folds or collapses it is important to keep your flying direction by applying brake on the opposite side.
The wing should re-inflate on its own without any input from the pilot.
To help re-inflation it is possible to pull some brake on the collapsed side and release immediately.
In the event of a big deflation, i.e. 70%, it is important to apply brake on the inflated side of the wing, but care must be taken not to pull too much as you could stall the flying side.
The wing is very solid and has a strong tendency to re-inflate after collapse.

16.1.3 CRAVAT

In case a cravat should occur from an asymmetric collapse or other manoeuvres, it is important to keep your flying direction by applying some brake on the opposite side and then it can usually be opened by pulling down on the stabilo line of the affected side while countering the turn with the opposite brake.

16.1.4 FRONT STALL OR SYMMETRIC COLLAPSE

In the event of a front stall the wing will normally re-inflate on its own immediately without any change of direction. To speed up re-inflation briefly apply 30%-40% brake (to pump open the leading edge). **Do not hold the brakes down** permanently to avoid an unwanted stall.

16.1.5 DEEP STALL OR PARACHUTAL STALL

Under normal flying conditions the LIFT EU will have no tendency to enter deep stall. All wings can however under certain conditions enter and stay in deep stall configuration (as a result of ageing of materials, improper maintenance or pilot induced).

16.1.5.1 Signs of parachutal stall

• The pilot has very little or no forward speed and no wind in his face.
• The wing will be fully open but the cells will be bulging in and not out on the bottom surface.
• The wing might have a very slow turning sensation.
• You will have an increased vertical descent.

16.1.5.2 Exit from parachutal stall

It is important to recognize this situation. Most accidents involving parachutal stall happen because the pilot did not realize that he was in deep stall.

The best way to exit a parachutal stall is to pull all the A risers down to get the wing flying again. The pilot can pull the riser down until the wing starts to fly again. The moment the wing starts to fly the pilot should release the A risers, or the wing might suffer a frontal collapse.
The wing is equipped with SRS system to aid automatic recovery from stall.

Alternatively the pilot can open (activate) the trimmers to lower the angle of attack and get the wing flying again.

By pulling one or both brakes while in deep stall the pilot can accidentally enter a full stall or spin. (Not recommended)

16.1.6 SPIRAL DIVES

The LIFT EU has very good behaviour in spiral and has no tendency to stick in the spiral. By progressively applying brake on one side the wing can be put into a spiral dive. Safe

high sink rates can be achieved like this. The spiral has to be exited gradually by releasing the brake over one complete turn or the wing may pitch forward and possibly suffer a collapse.
Care must be taken that the pilot has enough height to exit the spiral safely.
Sink rates in excess of 19m/s can be obtained (not recommended).

CAUTION:
SOME WINGS CAN BE NEUTRAL IN SPIRAL AND MAY NOT EXIT WITHOUT PILOT INPUT. TO EXIT A NEUTRAL SPIRAL THE PILOT HAS TO LEAN HIS/HER WEIGHT TO THE OUTSIDE OF THE TURN OR APPLY BRAKE INPUT TO TURN OUT OF THE SPIRAL (ON THE OUTSIDE WING). AS SOON AS THE WING STARTS TO SLOW DOWN IN THE SPIRAL THE OUTSIDE BRAKE MUST BE RELEASED.

PILOTS CAN SUFFER BLACK OUTS IN SPIRALS AND THE PILOT HAS TO EXIT THE SPIRAL AS SOON AS he/she FEELS ANY ABNORMAL SYMPTOMS (Black dots in field of vision or light-headedness).

16.1.7 STRONG TURBULENCE

NEVER FLY IN STRONG TURBULENCE!
If you unexpectedly encounter strong turbulence, fly with rear **trimmers open and no brakes applied** to let the reflex stabilize the wing, use only secondary brake handles (stabilo / tip steering) and land as soon as possible.

16.1.8 STEERING NOT FUNCTIONING

If the pilot cannot reach the brake or steering lines for any reason or if they are not functioning properly, (for example: If they break on a damaged point) the pilot can control the wing by pulling down on the rear risers.
Care must be taken when steering like this, as much less input is needed to turn the wing and the response of the wing is also much slower than when using the brakes.

IF YOU PULL TOO MUCH ON ONE OR BOTH RISERS THE WING WILL SPIN OR STALL.

On the landing flare the pilot should be especially careful not to stall the wing too high.

16.1.9 LANDING

Before landing, the pilot should determine the wind direction, usually by checking a windsock, flags, smoke or your drift over the ground while doing one or more 360° turns.

• Always land into the wind.

• At a height of about 50 meters your landing setup should begin. The most commonly used one is to head into the wind and depending on the wind strength the pilot should reach his/her landing point by making s-turns.

• At a height of about 15 meters the final part of your descent should be made at trim speed into the wind.

• At a height between half a meter and one meter you can gently flare the wing by pulling gradually down on the brakes to the stall point. Sometimes it is not necessary to flare or a much smaller flare may be required, especially in strong wind conditions.

16.1.10 TREE LANDING

If it is not possible to land in an open area, steer into the wind towards an unobstructed tree and do a normal landing approach as if the tree is your landing spot. Flare as for a normal landing. On impact hold your legs together and protect your face with your arms.

After any tree crash landing it is very important to check all the lines, line measurements, and the canopy for damage.

16.1.11 WATER LANDING

As you approach landing, release all the buckles (and cross-bracing if present) of the harness except for one leg. Just before landing, release the remaining buckle. It is advisable to enter the water downwind. Let the wing pitch completely forward until it hits the water with the leading edge openings; the air inside will then be trapped, forming a big air mattress and giving the pilot more time to escape. Less water will enter the canopy this way, making the recovery much easier. **Get away from the wing and lines as soon as possible**, to avoid entanglement. Remember that a ballast bag can be emptied and then inflated with air for a flotation aid.

The wing should be carefully inspected after a water landing, since it is very easy to cause internal damage to the ribs if the canopy is lifted while containing water. Always lift the canopy by the trailing edge, not by the lines or top or bottom surface fabric.

17 POWERED FLYING

NOTE: Before each start it is necessary to perform a complete check of the wing, harness and trike.

In powered flight most of the wing characteristics remain as described above (chapter 15). Still there is additional information needed, concerning power output, proper matching of the wing/engine/propeller etc. APCO can try to give advice on some possible tested combinations, but if you contact your nearest APCO dealer or frame manufacturer they will always be ready to help.

17.1 FIRST FLIGHTS

In order to get familiar with your wing we recommend flying with trimmers at the 0 (neutral) position first in stable non-turbulent weather.
Once you feel confident with your wing, you can start experimenting with faster trim settings and front trimmer, taking all precaution. Learn to use all of the additional speed of the LIFT EU remember: do not exceed the envelope of weather, wing and other parameters to insure safe flying.

17.2 TAKE-OFF

17.2.1 INFLATION

Check wind direction, even when it seems that there is no wind at all, there is always some drift.
Therefore be careful in determining the conditions, since in PPG flying it is most important that the launch and initial climb are performed with a head wind (the danger of losing your airspeed while crossing the wind gradient is greatly reduced).
Special attention must be paid to trees, power lines and other obstacles, including the possibility of unexpected rotors.

Launch preparation:

Warm up the engine, let it run for a while and stop the engine.
Lay out the wing in an arc, downwind of the trike, with all suspension lines tight and pointing toward center of the trike.
Connect the risers to the trike.
Connect the A assist (Optional)
Set the trimmers in 0 (neutral) positions!!! (all the risers branches are the same height)

Now have quick checks if:

- Helmet is on and fastened (Pilot and passenger).
- Safety belts are buckled (Pilot and passenger).
- The risers are clipped into the carabiners.
- The trimmers are properly set.
- Propeller is clear.
- Steering lines and handles are free and not twisted.
- The engine delivers full power.
- Take off area is clear of obstacles and free to use.

When you are sure all is OK, you can execute launch.
Open the throttle gradually but decisively, the best option is not to use the brakes, allowing the wing to rise as it was laid out.
If the wing starts to deviate from its course, pull/push forward the opposite riser and steer the trike to be positioned under the centre of the wing while continuing in the initial direction.

If the wind suddenly drops, give a strong pull on the risers.
If the wing falls to one side or back too far to lift again - kill the engine, abort the launch and check the conditions once again.

When the wing is over your head slightly reduce the rpm, briefly look at wing and check if it is inflated well and the lines are not tangled.
Once you feel the risers are fully tight and vertical, let go of the risers.
Make sure the wing is centered overhead, now squeeze the throttle for full power.
Feel that there is sufficient pressure on the brakes and, if necessary, use the brakes to correct direction or to increase lift at take-off.

Remember:

- Any brake operation (or steering input in general) should be smooth and gentle.
- Do not try to take off until you have your wing overhead. Hitting power too early can cause dangerous roll oscillations.
- The faster the trim setting is, the more brake input is required to take off.

17.2.2 CLIMBING

Once you are safely airborne, continue heading against the wind, using brakes to correct the direction.

Do not try to climb too steeply.
In powered flight the LIFT EU behaves more like an airplane than a paraglider, and it is good idea to regard it as such. If there are no obstacles present, it is by far safer to fly level for a while after take-off, clearing the ground gradually, gaining some speed before converting it to height with a brief pull on the brakes.
Another reason not to try climbing too steeply is the risk connected with engine failure at low altitude.
LIFT EU in a steep climb does not stay behind as much as conventional wings.
The SRS prevents or delays possible stall, but low speed at low altitude carries inherent danger of stall which even SRS will not be able to fully prevent
Besides, you should always be able to land safely in case of engine malfunction, so it's better not to take unnecessary risk and always fly with a safe margin of speed and height

Depending on the trike geometry, it is possible that after take-off you will notice a propeller torque (known as P-factor).
It will initiate constant side pull (turn), so counter-steer with a brake or trimmer set.
LIFT EU risers feature two hook in points, to help adjusting your ppg setting against torque.
When climbing steeply with slow trim settings and high power output beware of the possibility of stall.
Due to considerable vertical distance between thrust axis and wing chord - the range of safe power operation is closely connected to your skills and equipment.

Power-unit induced oscillations (roll yaw):
Certain configurations of engine weight, output and propeller diameter can cause oscillations, during which the pilot is being lifted to one side by the torque effect, swings down due to his weight, and then is lifted again and so on.

To avoid this you can:

- Change the throttle setting.

- Shift yourself to the other side of the harness and/or change the trimmer setting. The best method is to apply some weight-shift.

  Such oscillations usually occur at full power - the greater the engine output and propeller diameter, the bigger the possible swings.
  In addition pilot reactions can often be wrong or come too late, increasing the problem instead of solving it.
  In this case the safest way to deal with this question is to close the throttle and release the brakes.
  Less-experienced pilots especially tend to overreact.
  This is called a pilot-induced oscillation, and the proven solution is to **leave the brakes alone**.

17.3 LEVEL FLIGHT

If you have a variometer or altimeter – check it regularly.
In level flight it is very easy to start climbing unintentionally.
The instrument will help you optimize speed and fuel economy.
Of course each flight depends on configuration of your gear, but due to LIFT EU's ability to fly safely without constant piloting, it will let you adjust everything to the best effect.
Good knowledge of weather conditions (e.g. wind at different altitudes) and knowledgeable use of thermals, convergence or other kinds of lift will help you greatly reduce fuel consumption and increase flight range.
Of course the engine is always there to bring you to the right place.
Do not hesitate to thermal with the LIFT EU in order to win some altitude and spare fuel - you will be surprised how efficient it is.
Closing the trimmers will make the climb ratio even better.

17.4 REAR TRIMMERS AND FRONT TRIMMERS SETTINGS

You are free to experiment with all possible settings, **as long as you are at safe altitude and watch the weather**. Fully opened rear trimmers increase the speed of the wing and with it overall penetration and stability, **but when trimmers are opened it is highly recommended to use secondary steering only (stabilo/tip steering), using the main brake handles will increase the risk of a collapse.**

As forces on the brakes grow at high speeds, the weight shifting or steering with STABILO STEERING system becomes increasingly effective.
STABILO STEERING system can be used in all rear trimmer and front trimmer settings, also in combination with main brake handles. At fully opened rear trimmers and fully closed front trimmers we **highly recommend** steering with STABILO STEERING system.
Force needed to initiate the turn with stabile steering will be lighter and there will be no decrease in speed.

Slow trimmer settings decreases sink and steering forces, allowing for more efficient use of the thermals.
Worth noting is the LIFT EU's impressive speed range -the maximum speed is almost three times greater than stall speed.

Turns can be much improved by calculated use of throttle. Once you master these techniques, you will be able to execute fully coordinated and effective turns.

REMEMBER:
Trimmer setting is another part of the pre-start check list!
If it will be asymmetric, the wing will turn all the time.

17.5 LANDING

For powered flying there are two kinds of landing: with and without power.

17.5.1 POWER OFF LANDING

At an altitude of 50 meters switch the engine off and glide as you would on a paraglider.
It reduces the chances of damaging the propeller on landing, but on the other hand there is only one attempt possible -so it has to be done right!
LIFT EU preserves the energy well, so there is a long float to convert the abundant speed for lift with your brakes.

17.5.2 POWERED LANDING

Make a flat approach with the engine idling, then level out and lose the speed before final flare.
Immediately on landing, switch off the engine.
The main advantage of this procedure is of course the possibility of going around with the wing again (repeating the approach) if anything goes wrong.
Still, if you forget to switch off the ignition before the wing falls down, there is a considerable risk of damaging propeller or catching lines in it.

Remember:

- Whenever possible, get to know the landing field before taking off.
- Check the wind direction before planning the approach.
- Landing with power off requires much less space.
- In case of any doubt, practice the landing approach and go around until you feel totally safe
- Never place the trike downwind of the wing.
- Check, double check and then check once again that there is no fuel leakage.
- Do you have enough fuel for the flight? It is always better to have too much than too little!
- Check that there is nothing loose in the harness that could possibly contact the propeller in flight.
- Whenever you encounter a problem, fix it **AT ONCE** however small it is!
- Always put on and secure the helmet before getting in the harness.
- Before each launch run a full pre-flight inspection.
- After landing, continue to maintain the wing's direction straight, as on turning you always risk getting lines in the propeller.

    - Do not fly over water, between trees or power lines and other places where engine failure will leave you helpless, always make sure you have possibility for emergency landing.
    - Mind the turbulence caused by other wings or even by yourself, especially when flying low.

- It is not recommended to let go of the brakes below 100 meters, because a possible trike malfunction may require immediate attention.
- In general never trust your engine, as it can stop at any moment. Always fly prepared for engine failure.
- Unless it is absolutely necessary (e.g. collision avoidance), do not execute tight turns against the torque direction.
  Especially when climbing you can easily enter a stall or negative spin.
- Do not fly with tail wind at low altitudes,- it narrows your options !
- Do not wait for the problem to grow - any change of engine sound or a vibration may indicate a problem. You'll never know until you land and check it out!
- Be certain of your navigation
- Remember that not everyone is fond of your engine noise.

18 PACKING

Spread the wing completely out on the ground. Separate the lines to the left and the right side of the wing. If the risers are removed from the trike, join the two risers together by passing one carabiner loop through the other. This keeps them neatly together and helps to stop line tangles.

Fold the canopy alternately from the right and left sides, working towards the centre, press out the air, working from the rear towards the front. Place the risers at the trailing edge of the folded canopy and use them to finally roll up the canopy.

19 MAINTENANCE & CLEANING

Cleaning should be carried out with water and if necessary, gentle soap. If the wing comes in contact with salt water, clean thoroughly with fresh water. **Do not use solvents of any kind**, as this may remove the protective coatings and destroy the fabric.

19.1 BUTT HOLES (Velcro closure on trailing edge tip)

In order to empty sand and small stones from the wing simply shake the sand or small stones into the wing tip and open the **Butt holes** (**Velcro closure** on trailing edge tip) to empty. Do not forget to close the **Butt holes** afterwards.

20 STORAGE

When the wing is not in use, the wing should be stored in a cool, dry place. A wet wing should first be dried (out of direct sunlight). Protect the wing against sunlight (UV radiation). When on the hill keep the wing covered or in the bag. Never store or transport the wing near paint, petrol or any other chemicals.

Do not leave your wing in the trunk of a car or exposed to the sun.
Temperatures on a hot summer's day in a closed environment: car, etc. can easily reach over 60ºC
At these temperatures Nylon permanently changes its characteristics which may alter the behavior and shape of the wing.
It will cause permanent damage to the wing, rendering it non-airworthy. APCO's warranty will not be applicable.

21 DAMAGE

Using spinnaker repair tape (for non-siliconized cloth) can repair tears in the wing (up to 5cm). A professional repairer should repair greater damage.

22 GENERAL ADVICE

A qualified person or agent of the company should check the wing every year.
The wing is carefully manufactured and checked by the factory. Never make changes to the wing or the lines. Changes can introduce dangerous flying characteristics and will not improve flying performance.

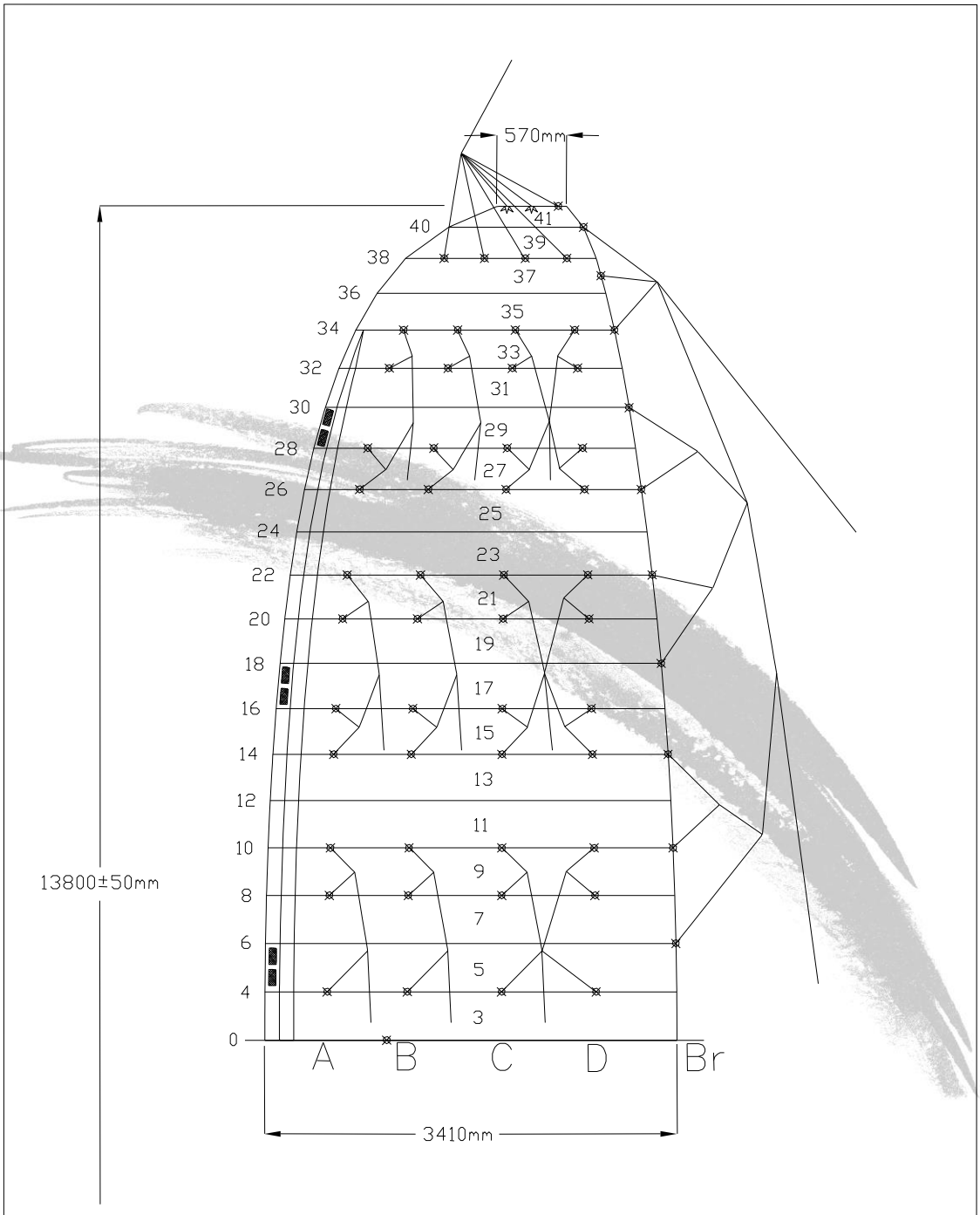
Do not put the wing in direct sunlight when not necessary. In order to protect the wing during transportation or waiting time we recommend one of our lightweight storage bags.

If you have any doubts about flying conditions or the wing - do not proceed.

If you have any questions, please contact your dealer or us.

Lastly, be equipped with a certified emergency parachute and helmet on every flight.

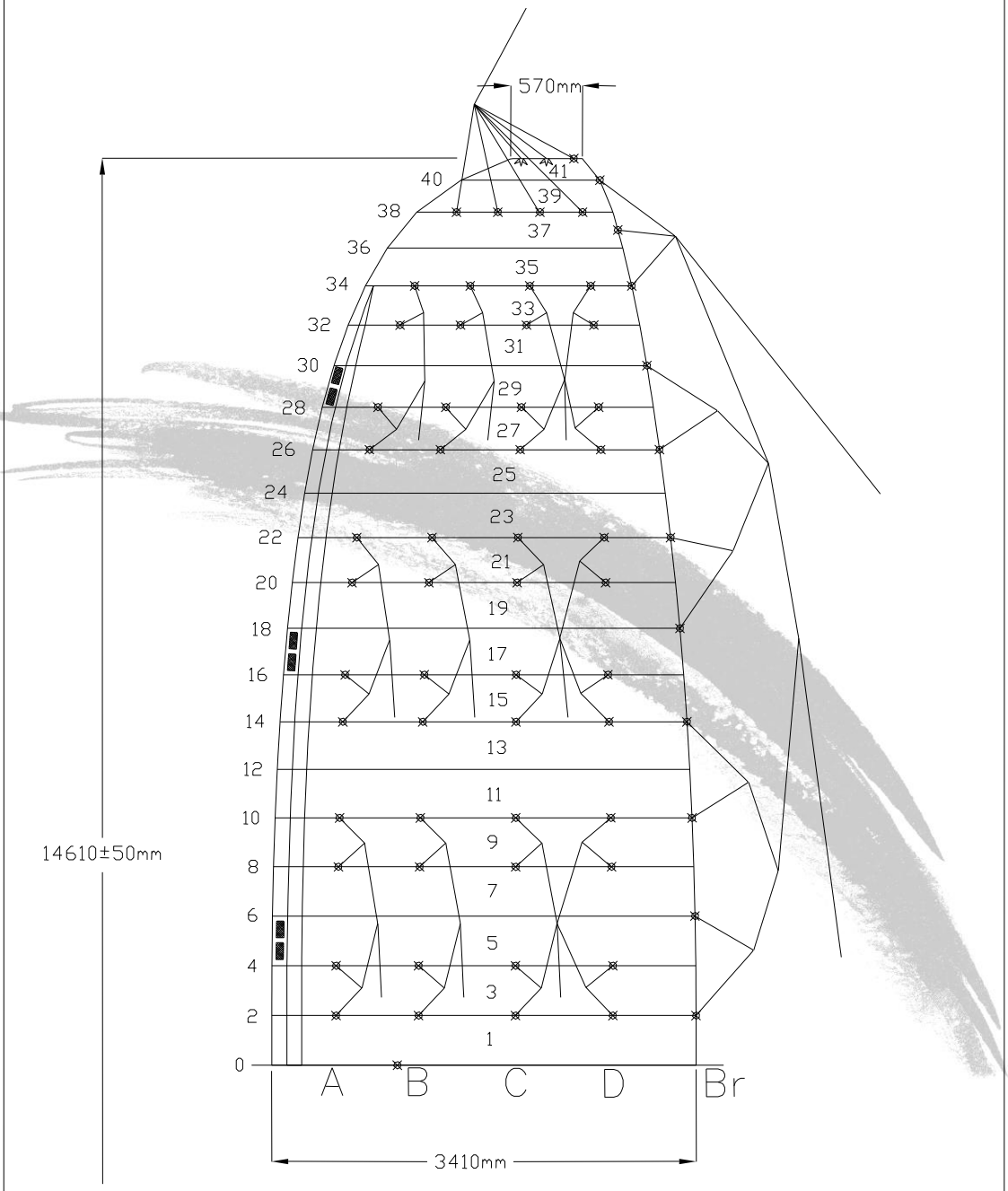
23 LIFT EU 400 SKETCHES



* All measurements are in mm

Drawn by Adam Wechsler	Part N	Toll ±10	
Date 29.06.15	Name		Drawing N
Scale	Lines sketch		
Approved Anatoly Cohn			
APCO Aviation LTD.	Product Lift 400 EU		Revision 0

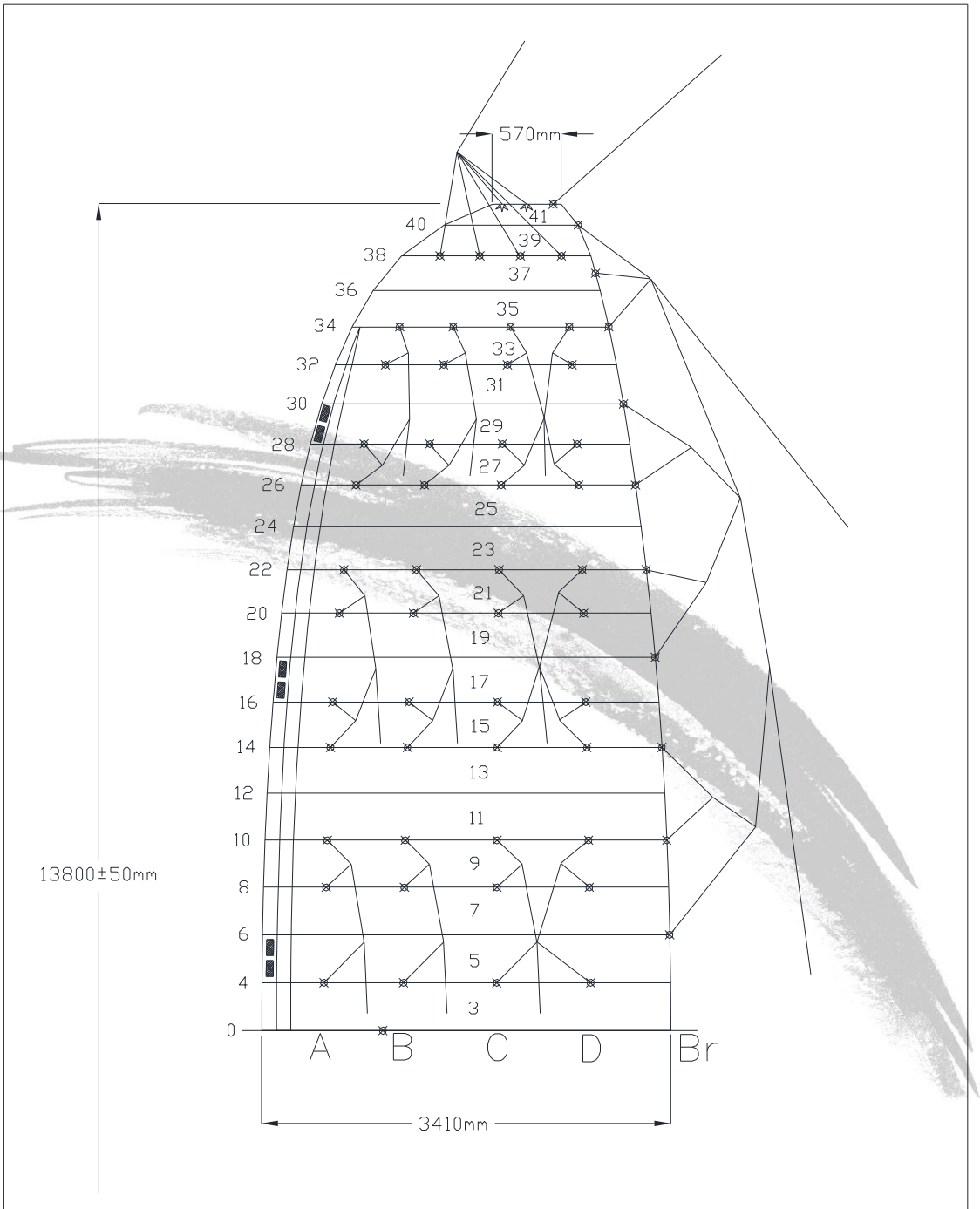
24 LIFT EU 450 SKETCHES



* All measurements are in mm

Drawn by Adam Wechsler	Part N	Toll ±10	
Date 24.08.15	Name		Drawing N
Scale	Lines sketch		
Approved Anatoly Cohn			
APCO Aviation LTD.	Product Lift 450 EU		Revision 0

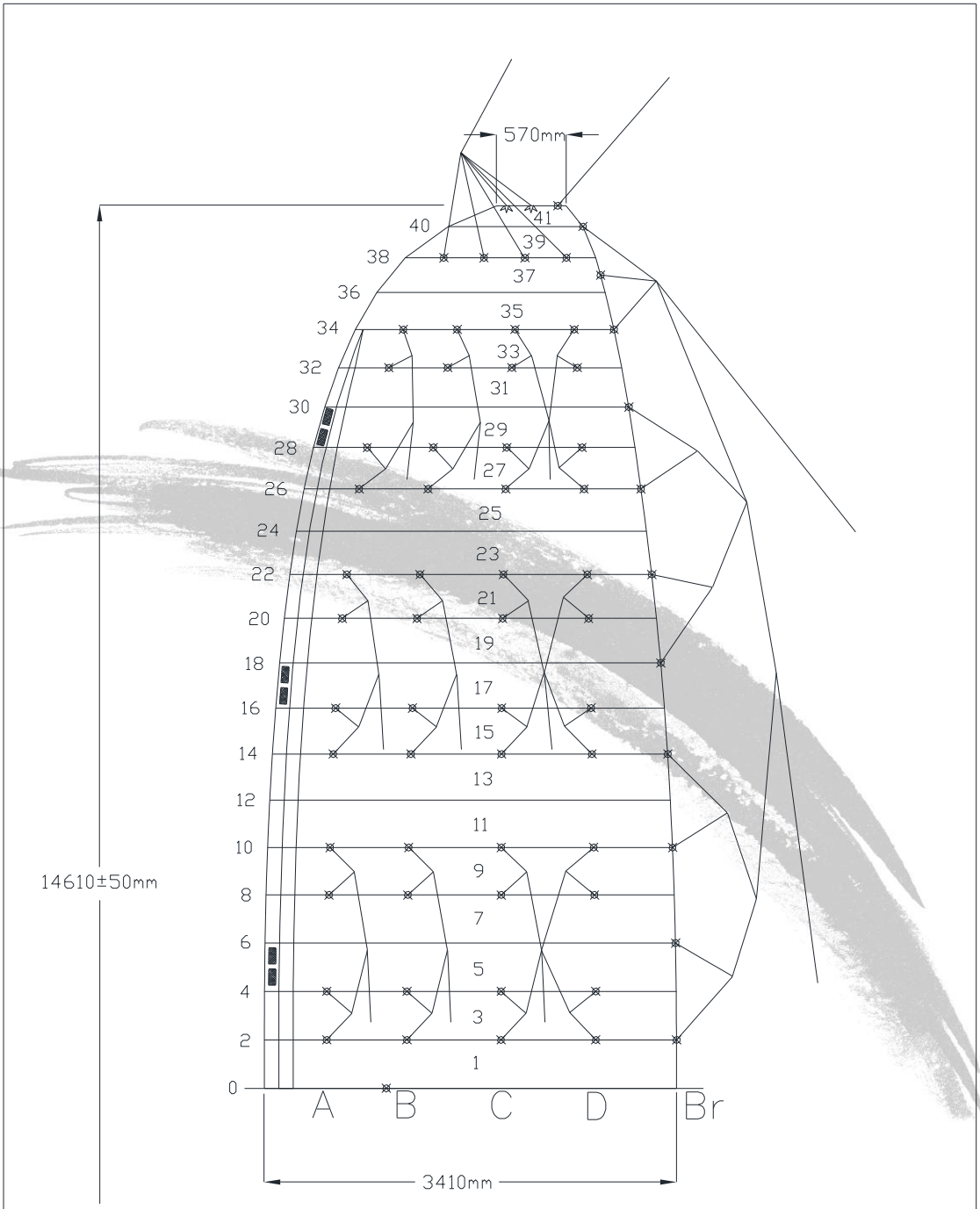
25 LIFT EU II 400 SKETCHES



* All measurements are in mm

Drawn by Adam Wechsler	Part N	Toll ±10	
Date 15.11.16	Name		Drawing N
Scale	Lines sketch		
Approved Jonatan Cohn			
APCO Aviation LTD.	Product Lift EU II 400		Revision 0

26 LIFT EU II 450 SKETCHES



* All measurements are in mm

Drawn by Adam Wechsler	Part N	Toll ±10	
Date 22.01.17	Name		Drawing N
Scale	Lines sketch		
Approved Jonathan Cohn			
APCO Aviation LTD.	Product Lift EU II 450		Revision 0

APCO wishes you many hours of enjoyable flying.

Take Air!