Charger² Trike

USER MANUAL

Version 1.0 Stand 1.2021

Contents

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GENERAL

Dear MAC PARA pilot

We congratulate you and appreciate your purchase of our paramotoring glider the Charger 2 Trike. Extensive research and development makes the Charger 2 Trike a state-of-the-art paramotoring glider. Numerous safety tests have been made to allow you to safely enjoy the performance of this glider. The entire MAC PARA team welcomes you and we wish you many pleasant flights. To stay safe you **MUST** read this manual carefully before flying.

Charger 2 Trike Highlights

The Charger 2 Trike is a reflex paramotoring glider. It was designed for skilled and experienced paramotoring pilots looking for an easy to use glider with a wide speed range and responsive handling. Other benefits are easy launch and landing speeds, excellent stability and efficient fuel consumption when paramotoring.

Please note the following details before you fly:

Get Proper Training

The purpose of this manual is to offer you information about the unique design features of the Charger 2 Trike for maximum enjoyment. This Manual is in no way intended to be used as a training manual. Paragliding and paramotoring are sports which demand high degrees of attentiveness, good judgement, and theoretical knowledge. Paramotoring can be a dangerous sport which may lead to injury and death. Get proper instruction before you attempt to fly with a qualified professional and accredited school. For a list of schools you can check out the official MAC PARA website at www.MACPARA.com

Take Responsibility

The use of this paramotoring glider is solely at the owner's risk! The manufacturer and distributor do not accept any liability. You are responsible for your own safety and the gliders airworthiness. MAC PARA assumes no responsibility. MAC PARA recommends the pilot is in possession of a valid paramotoring licence for the glider's category, insurance, and training etc. for the country in which the glider is flown.

Manufacture Quality Control Checks

Before delivery, as well as during production, each paramotoring glider goes through a strict visual inspection. It must also be test-flown by your dealer. Stamps on the placard with a completed test-flight certificate confirm this. It is your responsibility to check that your new Charger 2 Trike paramotoring glider has been test-flown before your first flight. If it has not, consult your dealer.

Minimize Your Risks

Any inadequate use or misuse of your Charger 2 Trike increases the risks considerably. On next page is a list of conditions that must be avoided.

DO NOT USE outside the manufacturers recommended weight range.

DO NOT USE during rain or snow-fall.

DO NOT USE in high or gusty wind conditions

DO NOT USE in cloud and fog.

DO NOT USE without sufficient knowledge or experience.

DO NOT USE under the influence of drugs, alcohol or sickness.

DO NOT USE for aerobatics or extreme manuvers.

NOTE: Any changes or modifications made to this paramotoring glider invalidate the certificate of airworthiness. Please check the warranty conditions near the end of this manual. Registration of your MAC PARA Charger 2 Trike is required.

MAC PARA Wants to Help

If you have read this manual and still have questions, suggestions or criticisms regarding the Charger 2 Trike, please do not hesitate to contact your dealer or MAC PARA directly. Our mission is to design quality performance gliders that allow you the freedom of flight while keeping you as safe as possible.

PILOT LEVEL REQUIREMENTS

Charger 2 Trike is an ideal powered glider suitable double seat trikes. The pilot must hold a license to fly a two-seater trike.

Various Conditions

The Charger 2 Trike can adapt to suit a full range of conditions and types of paramotoring. The exception is acrobatic flying. In strong turbulence and gusting winds a partial or complete collapse of the canopy can result. Never fly in such conditions.

Certification

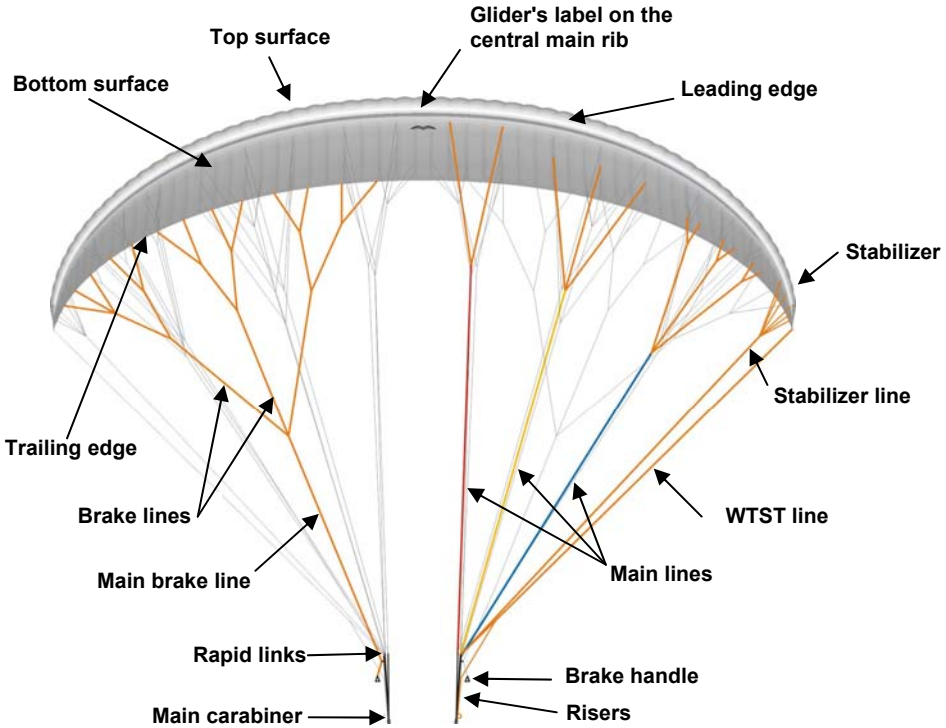
The Charger 2 Trike is tested in according to DGAC (French Airworthiness Requirements) for powered flying.

The Charger 2 Trike was shock and load tested to max. weight of 562 kg.

Mandatory

The user of this paraglider is responsible for installing emergency parachute system concerned and making sure that it complies with the regulations (in particular the additional technical conditions for an emergency parachute).

DESIGN



TECHNICAL DESCRIPTION

Construction of the canopy:

The canopy of the Charger 2 Trike has a wingspan with 50 cells. The wingtips are slightly pulled down to act as a stabilizer. The design of the Charger 2 Trike is a combination of second and third rib diagonal-construction. Every main rib is attached to 4 or 5 suspension lines. Between these main suspension ribs, intermediate ribs are suspended by diagonal segments. As complicated as this sounds, this construction ensures a smooth top surface and precise air foil design increasing performance and safety.

The internal reinforcements maintain the precise form of the canopy and increases stability. The cell openings on the under-surface of the leading edge provide good airflow into the glider. Load bearing support straps with diagonal ribs at the suspension points ensure an even distribution of load throughout the canopy. Stretch resistant Mylar strips on the top and bottom panels of the openings run the length of the trailing edge defining the wingspan.

This ensures optimized sail tension and guarantees high canopy stability. Large cross ports allow effective airflow inside the canopy providing good re-inflation without interrupting the profiles shape.

The Charger 2 Trike is mainly made from proven high quality Nylon fabrics. Nylon 33 dtex 38 g/m^2, Nylon 22 dtex 32 g/m^2, Nylon 33 dtex 40 g/m^2 HaF are the carefully selected materials. Important care must be taken to maximize the life of your glider because like any synthetic material, this can deteriorate through excessive UV exposure.

Rigging system:

The suspension lines are comprised of “cascaded top lines” (attached to the under-surface), and “main lines”. Main lines lead to the “quick links” (a small triangle carabineer which connects lines to the risers). The “stabilizer lines” connect the upper stabilizer lines on the outer suspension points with the quick link. The “brake lines” are not load carrying suspension lines. They lead from the trailing edge of the canopy to the main brake lines and run through the pulleys on the D-risers to the brake handles. Two black marks on the main brake line indicate the two possible positions of the brake handles. This adjustment allows for sufficient brake to be applied during flight and landing safety. It also ensures that brakes are not too short causing permanent applied brakes during flight (especially when fully accelerated). Having your brakes too short is dangerous!

Special attention is required before adjusting your brakes.

For differentiation purposes, the main A-lines are coloured red, the main brake lines are orange, and all remaining main lines are yellow. The main suspension loop on the bottom of the riser is reinforced and covered red. This is where the main carabineer must be hooked in connecting the risers to the harness.

The lines of the Charger 2 Trike are made of strong and stretch resistant HMA Aramid/Kevlar (yellow core) lines and PES/Dynema (white core). The entire rigging system comprises of individual suspension lines looped and stitched at each end. This contributes to the glider being incredibly strong.

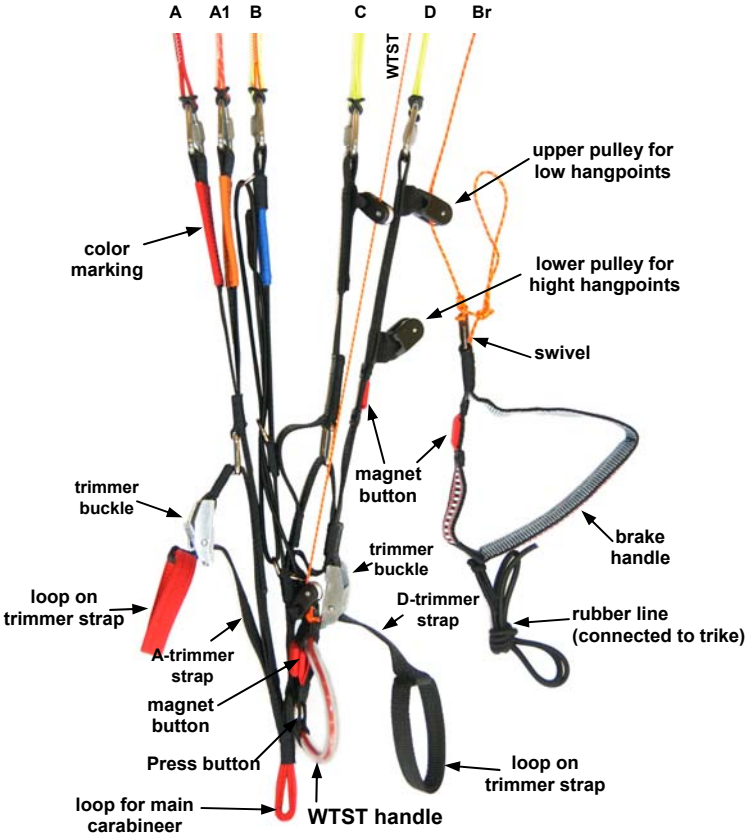
The main Polyester sheathed Dynema and Aramid lines have strengths from 190 kg up to 500 kg. The upper cascade lines have strengths from 75 kg up to 180 kg. The brake lines have strengths from 100 kg up to 130 kg. The main Dynema brake line has strenght 300 kg. Add up the strength of all the lines to understand the design of the Charger 2 Trike provides you with safety and confidence.

RISERS

The Charger Trike is serial equipped with 5 risers per side (A, A1,B, C, D). The two central A-lines per side are attached to the main A-risers (red in colour) while the outermost A main lines and the stabilizer lines are attached to A1 risers. The 3 B-main lines are attached to the B-riser together with the stabilizer line. The 3 C-main lines and the C stabilizer / WTST line are attached to the C-risers and the 3 D-main lines to the D-risers. The main brake lines lead through the pulleys on the D risers. The higher pulleys are used when flying a low attachment style paramotor and the lower one for higher attachment style paramotors or trikes.

The line connections are made to triangular carabineers (quick links) fitted with a rubber ”o- ring” in the form of a ”figure eight” which prevents any slipping of the lines on the quick link.

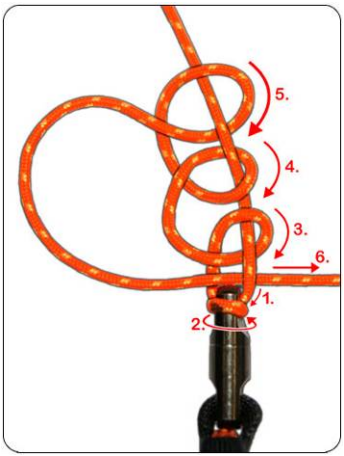
Riser`s scheme



Brake handles:

Special semi rigid brake handles are equipped with swivels and two neodymium magnets. Strong neodyme magnets hold the brake handles perfectly to the D risers. Attaching and releasing the brakes from the risers work very easily and quickly during flight. This minimises the danger of getting them caught in a spinning propeller.

Brake handles



Brake line knot

Wingtip Steering (WTST):

This reflex wing offers wide speed range. Usual steering via main brake toggles by open trimmers gets heavier and the risk of a total collapse of the canopy at maximum speed increases.

In accelerated flight mode the Charger 2 Trike must be controlled only by Wingtip Steering. The WTST handles have a size for two fingers and are equipped with neodymium magnets and press buttons.

We paid high attention that the WTST brake range are similar to the main brake range. The WTST brake forces are lighter then by serial brakes. The position of the WTST handles is very pleasant for use in accelerated flight. Return to the top position is secured with a rubber line and neodymium magnet. If you are not using WTST handles for the steering connect them always additionally by press buttons on risers.

Trimmers:

The Charger Trike has a wide in flight speed range due to the range of different trimmer settings. The Charger 2 Trike riser has A-trimmer on A straps and D-trimmer on D strap.

The D-trimmers have a deceleration range of 3,0 cm and 5 cm of acceleration. On the faster setting (D-trimmers fully open and extended) the Charger Trike's speed increases. The wing is less sensitive to turbulence and the stability improves. On slower trimmer settings (neutral or trimmers pulled all the way down), sink rate improves and the brake pressure becomes lighter. You will feel that the wing is more sensitive flying through bumpy air with trimmers pulled all the way in. To help you identify the neutral position of each D-trimmer, look for the white stitching. It is important to check and set the trimmers in the same position for each riser before take-off and in flight to avoid unwanted turns.

The speed of the Charger Trike with closed trimmers (trimmers pulled all the way down) depends on wing loading and moves around 40-45 km/h with a relatively low effort of the engine. With additional brake pressure the cruising speed is around 36-41 km/h. This will give you the best sink rate and requires the least amount of thrust from your engine for level flight. This position is ideal for economy navigation tasks.

The neutral trimmer position (marked with a white line) is the position where the risers are level. The Charger Trike still turns very well and restores plenty of energy flying around 43-48 km/h. It requires a little more RPM from your engine compared to the closed trimmer position.

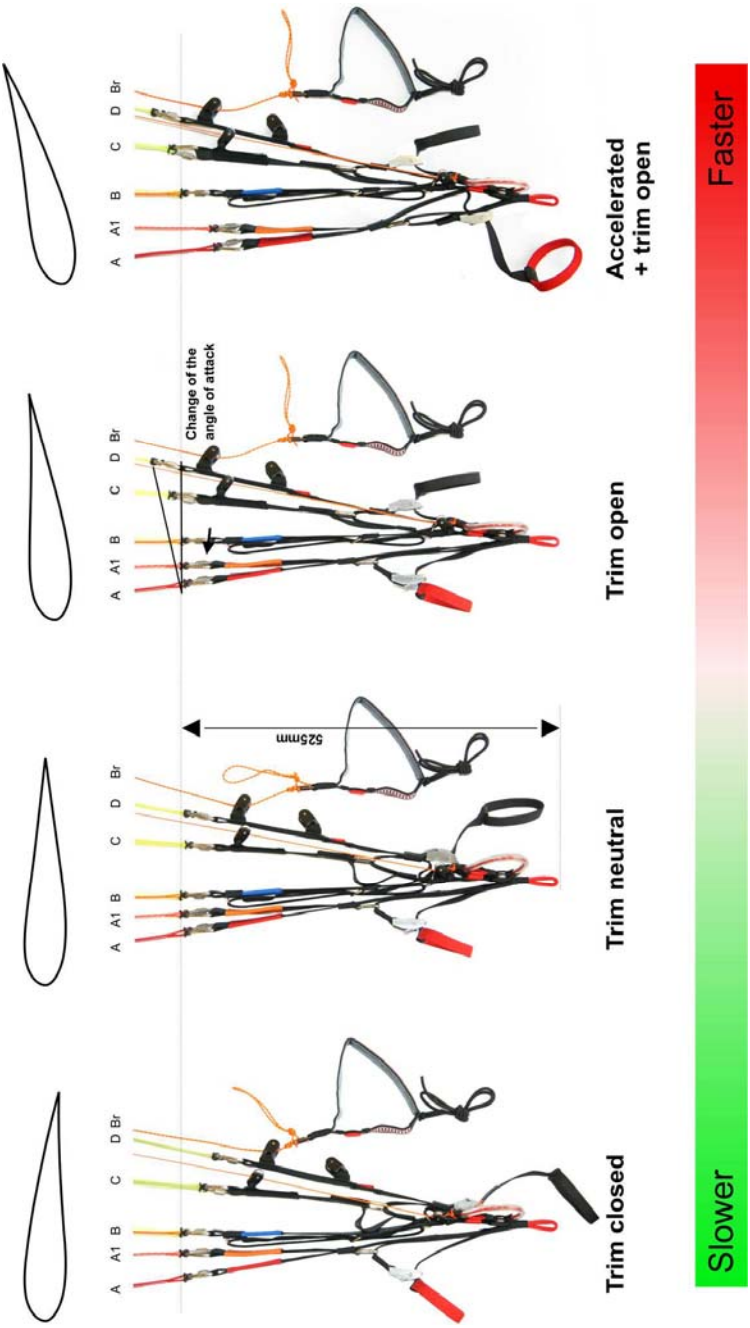
With the trimmers fully open the speed is around 48-56 km/h. You will notice the main brakes will become harder to pull. This is normal. With fully released trimmers the canopy is in its semi reflex mode and becomes more solid.

To fly at maximum speed with your Charger Trike, fully release D-trimmers and pull A-trimmers. The maximum speed is around 53-60 km/h. Higher fuel consumption will result in this configuration. By this A- and D-trimmer settings steer only with WTST toggles. When returning to normal trimmer settings first release A-trimmers and only then pull D-trimmers to the preffered position.

The A-trimmers have 3,5 cm range for acceleration.

WARNING! Never fly with settings A-trimmers pulled and D-trimmers pulled. This trimmer setting is very dangerous. Use A-trimmers only when D-trimmers are fully released.

WARNING! Do not use the brakes when the Charger Trike is fully accelerated.


A A1 B C D Br
525mm
Change of the angle of attack
Trim closed
Trim neutral
Trim open
Accelerated + trim open
Slower
Faster

MATERIALS

Tissue

SKYTEX / MJTEX

Top Sail - Leading Edge –100% nylon 6.6, 33 dtex, 38 g/m^2
Top Sail - Trailing Edge - 100% nylon 6.6, 33 dtex, 38 g/m^2
Bottom Sail - Leading Edge - 100% nylon 6.6, 33 dtex, 38 g/m^2
Bottom Sail -Trailing Edge - 100% nylon 6.6, 22 dtex, 32 g/m^2
Ribs, Diagonals - 100% nylon 6.6 HF, 33 dtex, 40 g/m^2
Reinforcement Ribs - Laminated Polyester 160 g/m^2

Lines

(EDELMAN+RIDDER+CO. Achener Weg 66, D-88316 ISNY IM ALLGEAU, GERMANY)

Upper lines, Stabilo - Aramid/Polyester A-7343-075, Breaking Load 75 kg
Upper lines - Aramid/Polyester A-7343-090, Breaking Load 90 kg
Middle Galery D, Stabilo - Aramid/Polyester A-7343-140, Breaking Load 140 kg
Main lines D1 - Aramid/Polyester A-7343-190, Breaking Load 190 kg
Main lines C1, D2, D3 - Aramid/Polyester A-7343-340, Breaking Load 340 kg
Main lines A1, B1, C2 - Aramid/Polyester A-7343-420, Breaking Load 420 kg
Brake line - Dynema/Polyester A-7950-100, Breaking Load 100 kg
Brake line - Dynema/Polyester A-7950-130, Breaking Load 130 kg
Main brake line - Dynema/Polyester A-0010-300, Breaking Load 300 kg

(ROSENBERGER TAUWERK, GERMANY)

Main lines A2, A3, A4, B2, B3, B4, C3 - Aramid/Polyester TSL 500 , Breaking Load 500 kg
Upper lines - Dynema /Polyester PPSL 160,Breaking Load 160 kg
Middle Galery A, B - Dynema /Polyester PPSL 260,Breaking Load 260 kg

Attachment straps

(STUHA a.s., DOBRUSKA, Opočenská 442, 518 01 Dobruška CZECH REPUBLIC)

STAP-POLYESTERBRIDLE 13 mm, Breaking Load 70 kg

Risers

(Mouka Tišnov, Koráb 133, 66601 Tišnov, CZECH REPUBLIC)

Polyester 366 025 025 912 25x1,5 mm Breaking Load 900 kg

Thread

(AMANN SPONIT ltd, Dobronická 635, 148 25 PRAHA 4, CZECH REPUBLIC)

Lines-SERAFIL 60, Canopy- SERAFIL 60, Riser-SYNTON 20

Rapid links

(PEGUET MAILLON RAPIDE, FRANCE)

MRDI 04.0 DELTA INOX S10 B100 - Breaking Load 1000 kg

Rigifoils

(Seabird Metal Material co, ltd)

Nitinol 0,8 mm

GLIDER CHECKLIST

Before delivery, as well as during production, each Charger 2 Trike paramotoring glider goes through a strict visual inspection. Additionally, we recommend that you check your new glider in accordance with the following points below. The Charger 2 Trike is a form of aircraft and must be treated as such. We also recommend that you make these checks after flying extreme manoeuvres, tree landings or similar events.

- Inspect the canopy for tears or damage. Pay particular attention to the seams. Look at where the ribs join at the upper and lower surfaces and the areas of the attachment tapes and brake-line connections.
- Inspect the lines for damage and look for damaged stitching. The line lengths must be checked after 50 hours flying time and/or whenever the flight behaviour of the glider changes.
- Inspect the attachment points for damage to the stitches. It is equally important to free brake-lines from tangles before each flight.
- Inspect the risers for overall condition and check for frayed seams. Rapid links must be secured.

Understand that with slight damage the glider could lose its airworthiness! Fly safe by spending extra time to perform regular checks on your gear.

Brake adjustment and brake handles:

We strongly recommend brake adjustments be supervised by a paramotoring instructor or done by a pilot that understands the importance of proper brake line length. Improper brake line adjustment can lead to unsafe reactions of your glider. With a brake line adjusted too short the canopy will lose its easy take off behaviour.

Before flying the Charger 2 Trike please check the setting of the brake lines and adjust them in accordance to your hang points. On the risers diagram you can see there are two brake line pulleys on each riser, higher and lower. The brake lines have two black marks identifying recommended brakes positions.

When flying paramotors with lower or middle hang points (main carabineer 50-70 cm from seat plate) the brake lines should lead through the higher pulley on each riser and the brake handles should be tied to upper black coloured mark position on the brake lines. Your Charger 2 Trike glider comes from the MAC PARA factory with brake lines set to this position.

When flying paramotors or trikes with higher hang points (main carabineers higher than 70 cm or trikes) the brake lines should lead through both the upper and lower pulley located on each riser and the brake handles should be adjusted to be tied on the lower black mark of the brake lines.

Once you choose your appropriate brake line length that matches your paramotors hang point style, check the set up by inflating the glider in an open area with a constant breeze with the engine off. When the canopy is stabilised above your head, check that the trailing edge of the wing is not being pulled down. When you gently pull the brakes you should only have 5-10 centimetres of movement before the brakes start to pull down on the trailing edge of the wing. Make sure that the brake length is the same for both sides. It is safer to have brake length a bit longer than too short.

When free flying (paragliding) the brake line should be led through the upper pulley and the brake handle tied onto the upper black mark on the brake line. This makes the brake position perfect for a paragliding harness because of their lower hang points.

Attention!! All new gliders leave the MAC PARA factory set up for “lower-middle” hang points!

FLYING THE CHARGER 2 TRIKE

The following information is NOT under any circumstances a manual for practising paramotoring. We would like to advise you of important information to increase safer flights and security while flying the Charger 2 Trike.

Paraglider Preparation

After unpacking and laying out the paramotoring glider in a slight horseshoe pattern, the following checks must be made:

Checklist before every flight:

Checking and inspecting the wing:

- Canopy without any damage?
- Risers without damage?
- Maillons (quick links) closed tight?
- Stitching of the main lines near the risers o.k.?
- All main lines run free from the riser to the canopy? Brake lines free?

Before putting on the harness:

- Warm up your engine and stop the engine before clipping in the risers.
- Rescue/reserve handle and deployment pins secure?
- Buckles (leg- , front riser) closed?
- Main carabineers attached and properly closed?

Before take-off:

- Ensure helmet is on and chin strap fastened.
- Attach speed bar system and connect properly.
- Check that the risers are not twisted.
- Look to see the trimmers are properly set to neutral (white stitching).
- Check the brake handle and brake lines are free and not twisted.
- Confirm nothing will get in propeller's way.
- Centre yourself relative to the wing (all lines same tension).
- Test engine to deliver full power.
- Check wind direction.
- Check for obstacles or tripping hazards on the ground.
- Identify free airspace.
- Look out for obstructions in the direction of desired flight path.

When laying out the glider, the wind direction must be observed for a successful launch. The canopy should be orientated into the wind so both sides are loaded symmetrically. The glider should be arranged in a semicircle (horseshoe) against the wind. This ensures that the A-lines in the centre section of the canopy will be tensioned before the wing tips. Doing this inflates the canopy evenly and allows for an easy launch in the desired direction.

All lines and risers should be carefully checked, untangled and arranged in a way that they do not catch on anything. It is equally important to untangle the brake lines so that they are free and clear so they do not catch on anything during launch. The brake lines should run freely through the pulleys to the trailing edge of the canopy. Make sure the risers are not twisted; this can prevent the brake lines from running freely through their pulleys. It is nearly impossible to untangle lines during flight. It is important that no lines are looped around the canopy. Also called a “line-over”, this may have disastrous consequences during take-off. Finally, connect the risers to your trike by using the main carabineers. Check carefully that they are closed properly.

Preparing for take-off:

As with any aircraft, a thorough pre-flight check must be made prior to each flight.
Before every launch check lines, risers and canopy for damage! Do not launch with even the slightest damage!

Also check the maillons connecting the lines to the risers. They must be closed tight.

Getting ready for Flight

Connect the paraglider risers to your trike with the main carabineers. Check carefully that they are properly closed. Let the passenger sit in the harness and check if the straps and their buckles are properly closed. Sit down in pilot`s harness and check if the straps and their buckles are properly closed. Check that the handle of the reserve parachute is securely fastened to prevent accidental deployment. Look to see that the flaps of the outer container are fastened securely and correctly. The main carabineers must also be checked carefully if thez are in a proper position. Replace carabineers if any damage is visible or if you have accumulated 300 flying hours.

ATTENTION! Never fly with an open main carabineer!
ATTENTION! Do not take off if you find any damage on your equipment!

Launch Technique

The Charger Trike is very easy to launch. With a very weak or zero wind it requires an appropriate launch technique. Before take-off, recheck the canopy, trimmer setting, wind direction and the air space around you. When you are ready to take off, hold all A-risers and the brake handles in each hand. If there is wind present then just hold the centre A risers in each hand. If you don`t hold A risers the Charger Trike wil also inflate when trimmers are set to neutral position. Before the canopy arrives over your head apply brakes to stop its energy to avoid collapse. When you approach take off speed gently apply the brakes (max 30% of the brake range). The faster the trimmer setting is, the more brake input is required for take-off. Set the trimmers to neutral for easy launching. Once you have safely taken off continue heading into the wind. Do not try to climb too steeply by applying too much brake. The additional drag caused by brakes decreases actual climbing rate.

Golden rule! For any aircraft the most important thing on take-off is proper amount of speed. High angles of attack and low speeds are more likely to cause a stall.

ATTENTION! You should always be able to land safely in case of engine failure.

Wind	Trim settings	Launching technique & additional settings
under 1 (m/s)	Released for 1-2 cm.	- start with lines under tension - try to minimize use of the brakes. - use of full thrust when canopy at 80°
1 - 3 (m/s)	Neutral or closed for 1-2 cm	- start with lines under tension - use of full thrust when canopy at 80°
over 3 (m/s)	Fully closed	- start with lines under tension - use of full thrust when canopy at 80°

Flight

After take-off and applying full power the glider will be at a higher angle of attack. Some trike designs may have a tendency to roll under full power. The torque and gyro moments produced from different engines can lift you to one side developing a back and forth swinging motion. This happens more often on larger engines with bigger propellers flying with lower wing loadings. The safest way to deal with this is to throttle back and release the brakes. Do not let go of the brakes.

The Charger Trike can reach speeds of 43-48 km/h on neutral setting depending on the total weight.

Always fly with sufficient clearance from the terrain.

The Charger Trike best glide rates are with open brakes. Flying the Charger Trike with minimal altitude loss can be reached by lightly applying brakes and having the trimmers closed (pulled all the way in).

We recommend that your first flights with your Charger Trike be done with trimmers set on or just below the neutral setting (the white stitching mark) This is where the Charger Trike will feel more like a conventional paraglider wing. With this trimmer setting, try to fly with a small amount of brake at the point where they just begin to feel heavier.

In turbulent air fly with brakes lightly applied (15-20 cm) to maintain some internal pressure and trimmers set to neutral. This will help avoid canopy collapse. If the canopy pendulums forward correct this by promptly applying the brakes. A pendulum movement of the canopy backwards is corrected by easing up on the brakes to let the canopy move forward. When you have become fully confident in your wing try experimenting with slower and faster trim-settings, weight-shift and speed bar. The more time you spend on your Charger Trike the more likely you will enjoy the extra speed and security it will offer you.

Different trimmer settings

NOTE: Adjusting trimmers in flight requires more pilot attention.

With the trimmers fully open (trimmer buckle over and passed the white line) the wing's speed increases (good for flying long distances). The canopy becomes stiffer and is less sensitive to turbulence and its stability improves. On fastest trimmer settings (D straps released and then A straps fully pulled) the brake pressure increases and the handling changes. By this trimmers settings we recommend steering the glider only by using WTST toggles.

Would you apply the brakes with released D-trimmers and fully pulled A-trimmers the wing can collapse because it loses its reflex characteristic.

On the slower settings (trimmer buckle pulled below the white line), sink rate improves and handling becomes lighter, giving you an improved climb rate for thermaling and shorter and slower take-offs and landings.

Note!! If trims are not adjusted the same, the wing will turn. Trimmer setting is an important part of the checklist before every flight!

Steering - turns:

The Charger Trike is a very responsive paramotoring glider and reacts directly and instantly to any steering input. Weight shift input quickens turns and ensures minimal height loss.

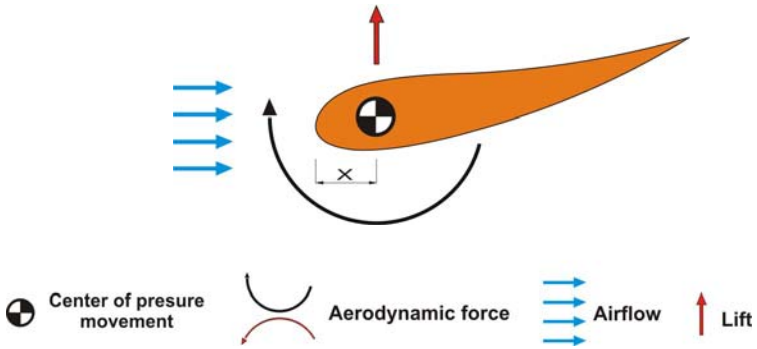
Attention! In the event that you lose your brakes lines, it is possible to control the Charger Trike with the WTST brakes or D-risers to steer and land the canopy. **Attention!** Pulling brake too fast or too hard can result in the canopy entering a negative spin.

Warning!! As already noted, do not apply brakes when fully accelerated with trimmers fully opened! Braking increases lift near the trailing edge. The main lift point moves backwards causing a loss in stability leading to big frontal or side collapse. Quickly letting off the throttle after being accelerated will cause the "pendulum effect". The glider can then surge forward which automatically decrease the angle of attack. This can easily lead to collapse in turbulent air. See drawings on pages that follow.

Study the following drawings of different trimmer settings and speed-system to see their influence on the wing stability.

Released trimmers without brakes

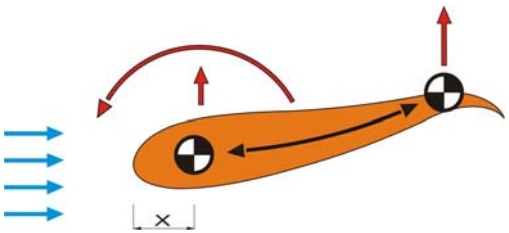
Preferred setting for fast and safe flying. The centre of gravity of the air foil is moved forward, the wing has higher resistance to collapses. Pitching moment decreases.



Released trimmers with brakes applied

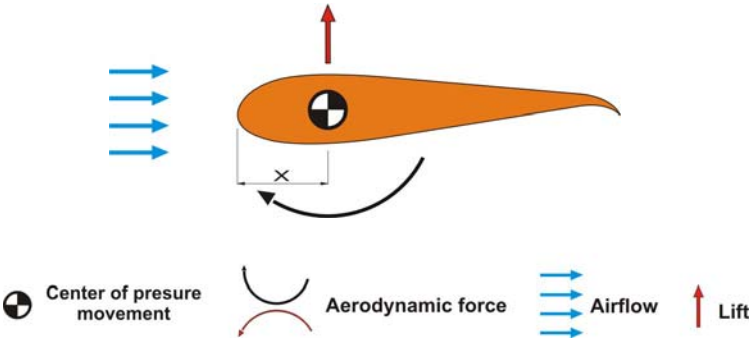
Slight brake input (when fully accelerated) will produce lift close to the trailing edge. The centre of gravity of the airfoil is moved back and the higher pitching moment significantly decreases the stability.

Warning!! Especially in turbulence this can lead to a collapse by fast trimmer settings! Therefore we strongly recommend you only steer by pulling on the WTST lines and not touching the main brakes.



Closed trims

Using the trimmers in the pulled closed position with brakes gives you the slowest speed and most sensitive feeling of the Charger Trike. The canopy behaviour is similar to that of a classic paraglider.



Approach and Landing:

It is important to start to prepare for landing at an adequate altitude to avoid surprises. This leaves you enough time to observe and appropriately deal with wind direction and any other aircraft in your vicinity.

The Charger Trike is very easy to land. The final leg of the landing approach must be into the wind. There are two methods in landing a trike. One without power (this minimises the risk of propeller damage in the event of a fall) and the second with power.

Power off landing

When deciding to land your paraglider check the wind direction and your height. The next step is to power off your engine at about 30 m. Glide toward your landing like a paraglider with trimmers set in the neutral setting with your brakes released. During your final glide just before touch down, you need to decelerate the glider by pulling your brakes converting your excess speed into lift before your feet touch the ground. Proper timing and how fast to pull your brakes depends on conditions. A general rule is to pull down on your brakes when trike wheels are approximately 0.5m over the ground. If too much brake is pulled too early, the glider may climb gaining height resulting in a sudden drop to the ground. Strong wind landings require correspondingly less brake.

Every pilot should practice landings without power because one day your engine will fail (run out of gas etc.) and this skill could be useful.

Power on landing

Fly towards your desired landing area at a shallow angle. Start to flare the wing before touch down to loose speed then switch off your engine immediately after touchdown. After stopping the trike, it is now very important to let the canopy slowly fall to the side in such a way as to avoid damage to the canopy.

Attention! Do not allow the canopy to come crashing down onto the leading edge. This can destroy the internal structure of your glider and affects the life of the ribs at the leading edge.

The advantage of the power on landing is that if you get it wrong you can power up to launch and try again. The disadvantages are the increased risk of expensive propeller/cage damages if you approach too fast or forget to flare in time. Another danger is falling over with the engine running and getting your lines caught in the propeller. Make sure you switch off the engine before the wing deflates on top of you.

Attention! The final glide on approach during the landing should be straight and not done with any steep or alternating turns. This can result in dangerous pendulum movements too close to the ground.

If possible, get familiar with the landing field before the approach. Check the wind direction before landing. Landing with power off requires much less space. Practice makes the master. Practice until you feel totally safe.

TOWING, JUMPS FROM AIRCRAFT, AEROBATICS

WARNING!! The Charger 2 Trike is not suitable for towing.

WARNING!! The Charger 2 Trike is not suitable for jumps from aircraft.

WARNING!! The Charger 2 Trike is not designed to be used for aerobatics.

GOLDEN RULES

- Always carry out full pre-flight checks before launching.
- Never place your trike downwind of the glider.
- Check 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 in case of an emergency landing.
- 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, land and fix it at once.
- Always put on and secure your helmets before getting into the harnesses.
- Do not fly over water, between trees or power lines and other places where engine failure will leave you helpless and in danger.
- After landing, control the wing facing the direction of flight to keep the lines out of the propeller. Turn to face your glider to avoid falling backwards in high winds once the engine is turned off.
- Keep in your mind the turbulence caused by other powered gliders, heavy trikes or other aeroplanes.
- Keep in mind the turbulence caused by your own paramotor, especially when flying sharp turns, spiralling or flying low.
- It is unwise to fly hands-off the brakes below 100m because of possible engine malfunction requiring immediate attention.
- Unless it is absolutely necessary (e.g. collision avoidance), do not make tight turns against the torque moments. During steep climbs you easily can enter a stall under power and increase your chances to induce a negative spin.
- Never trust your engine! It can stop at any moment. Always fly being prepared for this especially at low altitudes by looking for safe landing areas.
- Avoid low flying downwind. It drastically reduces your options for safe landings.
- Listen for change in engine performance or noise. A new engine tone or a new vibration may indicate trouble. Do not wait for the problem to grow. Land and check it out.
- Be certain of your navigation
- Not everyone is a friend of your paramotor noise. Keep within the rules and the laws. Care must be taken when flying near livestock and animals.

CARE AND MAINTENANCE

Looking after your canopy correctly will prolong the life of your paramotoring glider and enjoyment.

Deterioration: a few tips!

- The canopy is mainly made of NYLON cloth which like any synthetic material, deteriorates through excessive exposure to UV. Hence, it is recommended that you reduce UV exposure to a minimum by keeping the paramotoring glider packed away when not in use. Even when packed in the bag do not leave it in the sun.
- Keep the canopy and lines as clean as possible. Dirt may penetrate into the fibre and damage the lines or the cloth.
- Ensure that the lines are not folded tightly. It's extremely important to avoid any sharp bending of the lines, especially the main lines. Pay careful attention to the lines to avoid damaging them. Any over stretching of lines apart from the strain imposed during normal flight should be avoided as over stretching is irreversible.
- Be careful not to allow snow, sand or stones to enter inside the canopy's cells. The weight can change the angle of attack or even stall the glider. Additionally, the sharp edges of foreign material can destroy the cloth!
- Check line lengths after tree or water landings. They can stretch or shrink lines.
- Never drag the wing over rough ground! This will damage the cloth on the wear points. When preparing the wing on a take-off with rough ground, don't pull the wing over it (i.e. by pulling the brakes). Try your best to pack the wing on soft ground.
- Uncontrolled strong wind take-offs or landings can result in the leading edge of the canopy hitting the ground at a high speed which may cause rips in the profile and damage the rib material.
- Clean your glider with fresh water after contact with salt water. Salt water crystals can reduce line strength even after rinsing in fresh water. Replace lines immediately after contact with salt water.
- Check canopy fabric after water landings with water currents. Waves can place uneven forces and cause cloth to distort in specific areas. Always remove gliders from the water by holding only the trailing edge.
- Prevent lines from catching on anything as they could be stretched. Do not step on the lines. Although the lines were tested with a bending test they can be damaged if stepped on while on a hard surface or if they come into contact with sharp objects.
- Don’t always fold the canopy symmetrically to the centre cell. This can cause constant stress on the same centre cell over time.
- Clean your paramotoring glider with only water and a soft sponge. Avoid water hoses, pressure washers and mashing machines. It is best cleaned by hand.
- Do not use any chemicals or spirits for cleaning as these can permanently damage the cloth.

Packing:

When a compact package is needed pack your Charger Trike accordion-wise rib on rib, nose wire on nose wire, so that the plastic rods in the ribs at the leading edge lie as flat as possible on one another, all at the same height. This will prolong your paraglider life and keep its fast and excellent filling qualities at takeoff. Only pack and store a dry paraglider, and avoid unnecessary compressing and tight packing. Otherwise store your powered glider loosely in delivered Mac Pack (quickly-bag).

Storage:

- Store the paramotoring glider in a dry space at ambient temperature away from chemicals and UV light.
- Never pack or store the glider wet. This shortens the life of the cloth. Always dry glider thoroughly before any packing or storage.
- Avoid subjecting your wing to high temperatures (e.g. the luggage space of a parked car in the sun)! Take into consideration some materials of your paramotoring glider are temperature sensitive.
- Watch out for bugs. Insects such as grass-hoppers and ants will simply eat their way out if rolled up with the wing. Grazing cattle can literally lick the coatings off the fabric and mice love to make homes in canopies! Hang up your wing in its bag off the ground during long term storage.

When sending your wing in the mail take extra care packaging it.

Repairs and checks:

- Tears in the canopy must be professionally sewn. Adhesive patches are only adequate for very minor damage. Contact your dealer or MAC PARA directly if you are unsure.
- Repairs should only be carried out by the manufacturer, distributor or authorized workshops. Only original spare parts may be used!
- The line geometry must be checked after every 50 hours flying time or whenever the flight behaviour changes.
- Any changes to the canopy lines or risers, except those approved by the manufacturer, will void the certificate of airworthiness and warranty.
- A new MAC PARA paraglider must be given a check every 24 months. With intensive use (> 100 flying hours per year, or excessively demanding use) an annual check is needed, after the first check.

Disposal:

- The synthetic materials used in a paramotoring glider need professional disposal. Please send disused canopies back to MAC PARA for proper dismantle and disposal.

The Charger Trike is delivered with a stuff-sack, Velcro compression strap, Mac Pack, repair kit and user manual.

What to do if you break a line

Breaking a line or multiple lines on your glider is unfortunate but can be fixed. Most of the time lines can be easily replaced with your glider being restored back to factory settings within a short time. Depending on the extent of the damage, the line repair can be done by you or a qualified professional MAC PARA approved facility. Consult your closest MAC PARA dealer or MAC PARA directly with the type of line you may need.

Identifying which line you require to replace the broken line can be found by laying out your glider outside, looking at where the damage line is and referencing the line plan guide near the end of this manual. The better you know what you need and how many, the faster you will get help with the correct advice. Not all lines are made from the same material or are the same thicknesses.

Damage to the Canopy

Paramotoring involves fast moving parts like a spinning propeller and hot engines. Sometimes those parts come in contact with your glider and can quickly cause damage to your glider. Do not fly your glider that has sustained any damage. Any damage to your glider needs to be professionally repaired before your next flight.

ATTENTION: Do not risk your life by flying a damaged glider.

If the rip, tear or damage is small and you have consulted with your dealer first, then the repair may be performed by yourself with proper adhesive repair cloth. To avoid confusion, it is recommended to send detailed pictures to your MAC PARA dealer or MAC PARA directly. Do not attempt to repair or fix the glider yourself without the proper advice from a qualified professional. Failure to do so will void your warranty and put you at risk.

Warranty:

MAC PARA guarantees free of charge repairs caused by the material or production faults according to the following scheme:

For powered flying the MAC PARA warranty covers 24 months (2 years) or 200 flight hours. With intensive use an annual check is needed, after the first 2 years check.

Warranty does not cover:

- canopy colour fading
- damage caused by chemicals or salt water
- damage caused by incorrect use
- damage caused by emergency situations
- damage resulting from accidents (airborne or not)

Warranty is only valid if:

- Every flight is correctly registered in a logbook of the wing.
- Conditions and temperatures of each flight are registered in the logbook
- The paraglider is handled in accordance with this operating manual.
- The purchaser has not carried out any modifications or repairs by him/herself (excluding small minor repairs with self-adhesive patches)
- The paraglider has been inspected according to prescribed timetable described above.

If you have bought your paraglider second-hand, ask the previous owner for a copy of his/her logbook that lists total flying hours since the date of first purchase and details of any safety inspections.

RESPECT NATURE

Practise your sport with respect for nature, wildlife and neighbours. Not everyone is a friend of your paramotor noise. Follow the rules and the laws in the country you fly in. Extra care must be taken when flying near livestock and animals.

CHARGER 2 TRIKE LINE PLAN

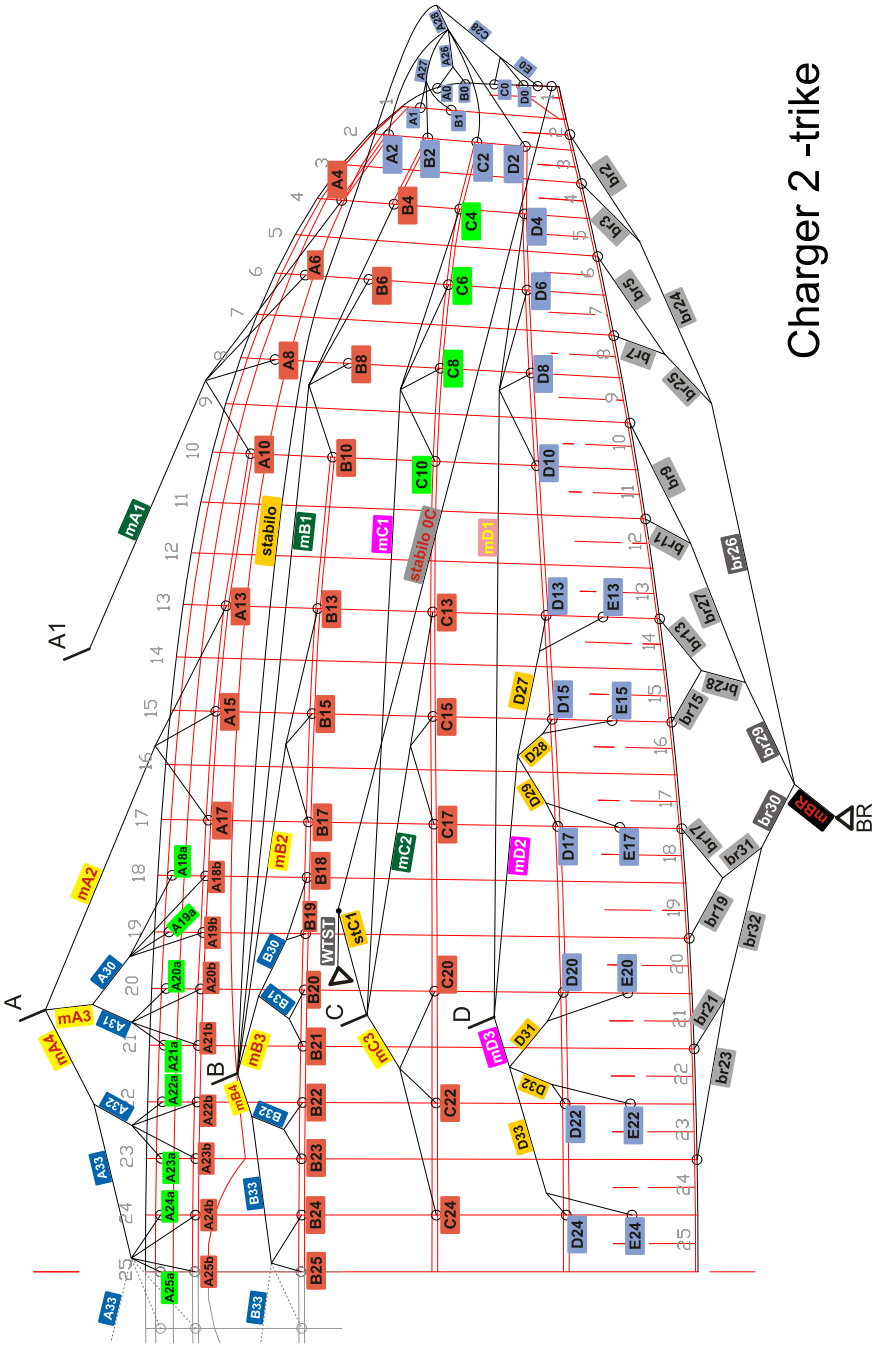
Line descriptions:

The following printed line plans show the line configurations and line lengths.

Line strengths in colors

Aramid/Polyester A-7343-075
Aramid/Polyester A-7343-090
Aramid/Polyester A-7343-140
Aramid/Polyester A-7343-190
Aramid/Polyester A-7343-340
Aramid/Polyester A-7343-420
PPSLS-160
PPSLS-260
TSL 500
Dynema/Polyester A-7950-080
Dynema/Polyester A-7950-100
Dynema/Polyester A-7950-130
Dynema/Polyester A-0010-300

LINE PLAN – SCHEME



RISER LENGTHS

The lengths are measured from main attachment point to the lower edge of rapid links.

Riser lengths – Charger 2 Trike	A	A1	B	C	D
Trims in neutral position	460	460	460	460	460
Trims closed (slower)	460	460	460	440	430
Trims open (faster)	460	460	460	480	510
Accelerated + trims open *	425	425	460	480	510

* Read more on the pages 16,17.

Brakeline lenghts	Charger 2 Trike 39	Charger 2 Trike 43
Low attachment on PPG harness	4,00 m	4,25 m
High attachment on PPG harness	4,15 m	4,40 m

FULL LINE LENGTHS

All lengths are measured from riser's main attachment point up to the tissue of canopy on attachment points. Brake lines are measured from the Swivel on brake handle up to the trailing edge.

Charger 2 Trike - 39

Center	Aa	Ab	B	C	D	E	BR
1	8499	8362	8260	8375	8606	8751	9342
2	8556	8419	8320	8296	8527	8670	9016
3	8468	8331	8232	8370	8594	8730	8825
4	8504	8369	8268				8755
5	8507	8371	8273				8670
6	8498	8362	8262				8490
7	8517	8380	8280				8422
8	8559	8442	8342				8423
9		8467	8375	8437	8633	8776	8285
10		8440	8351	8411	8595	8721	8217
11		8505	8415	8467	8632	8745	8126
12		8450	8344	8409	8547		8142
13		8305	8212	8263	8378		
14		8193	8115	8160	8239		
15		8109	8039	8065	8122		
16		7873	7829	7840	7950		
17		7728	7750				
18		7677	7642	7637	7645	7701	

Charger 2 Trike - 43

Center	Aa	Ab	B	C	D	E	BR
1	9033	8893	8790	8906	9148	9299	9955
2	9092	8952	8849	8818	9062	9213	9605
3	8995	8855	8752	8896	9133	9275	9405
4	9031	8894	8791				9330
5	9040	8900	8797				9235
6	9027	8890	8787				9045
7	9045	8907	8804				8970
8	9090	8971	8868				8970
9		9006	8906	8971	9180	9326	8815
10		8976	8881	8941	9136	9268	8755
11		9044	8951	9001	9175	9292	8655
12		8990	8882	8942	9074		8675
13		8829	8732	8786	8894		
14		8708	8626	8674	8746		
15		8620	8547	8575	8621		
16		8321	8271	8283	8404		
17		8165	8184				
18		8110	8066	8059	8070	8141	

CHECKS

Name	Company	Date	Signature & Stamp

PARAGLIDER & SERIAL NUMBER

Paraglider type:

Serial number:

Manufacturing date: .....

Commisioning date: .....

TECHNICAL SPECIFICATIONS

Paraglider for Powered Flying Size		Charger 2 Trike 39	Charger 2 Trike 43
Zoom flat	[%]	95,18	100
Area flat	[m2]	39,25	43,32
Area projected	[m2]	34,92	38,55
Span flat	[m]	14,31	15,04
Aspect ratio flat	-	5,22	5,22
Root cord	[m]	3,38	3,55
Cells	-	50	50
Weight	[kg]	8,60	9,15
Weight range powered*	**[kg]**	**180 - 450**	**220 - 450 (475*)**
Weight range powered*	[lbs]	397 - 992	485 - 992 (1047*)
Min. speed	[km/h]	26 - 32	26 - 32
Trim. speed	[km/h]	40 - 50	40 - 50
Top speed (acc.+trim open)	[km/h]	50 - 60	50 - 60

* using the corresponding rescue system

MAC PARA

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