COLORADO 2

USER MANUAL

Version 1.0 Stand 1.2023

Contents

MAC PARA COMMUNITY

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Dear MAC PARA pilot

We congratulate you and appreciate your purchase of our paramotoring glider the Colorado 2. Extensive research and development makes the Colorado 2 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.

Colorado 2 Highlights

The Colorado 2 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 Colorado 2 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.

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 should also be test-flown by your dealer. The test-flight certificate confirm this. It is your responsibility to check that your new Colorado 2 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 Colorado 2 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.

MAC PARA Wants to Help

If you have read this manual and still have questions, suggestions or criticisms regarding the Colorado 2, 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

Colorado 2 is an ideal powered glider suitable for skilled and experienced paramotoring pilots. With the right choice of glider's size, the Colorado 2 can be adapted to a wide range of requirements and styles of powered flying.

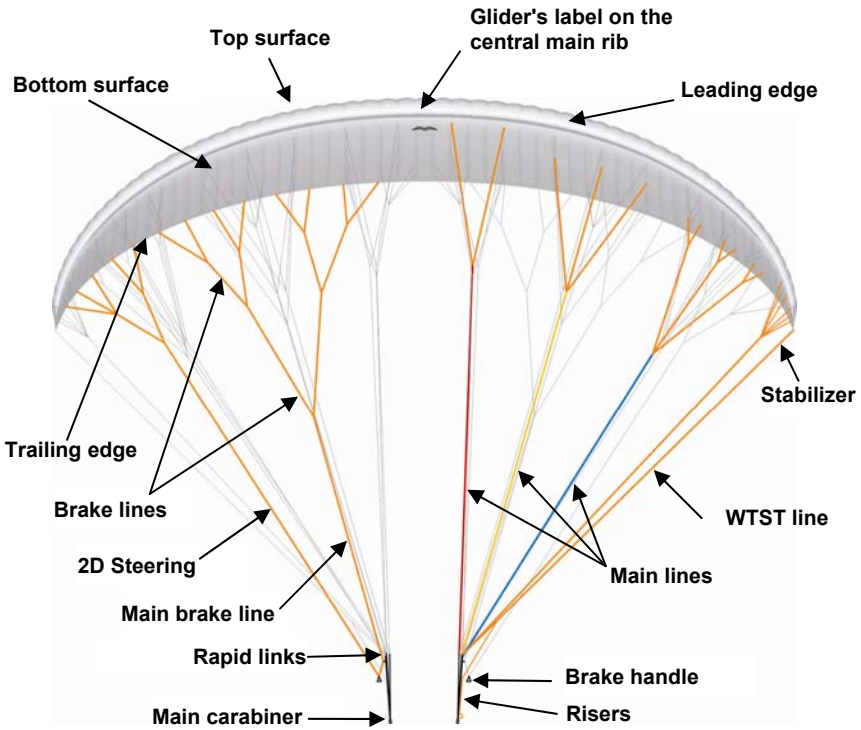
Various Conditions

The Colorado 2 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 Colorado 2 is tested in according to DGAC (French Airworthiness Requirements) for powered flying. The Colorado 2 was shock and load tested to max. weight of 268 kg.

DESIGN



TECHNICAL DESCRIPTION

Construction of the canopy:

The canopy of the Colorado 2 has a wingspan with 58 cells. The wingtips are slightly pulled down to act as a stabilizer. The design of the Colorado 2 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 Colorado 2 is mainly made from proven high quality Nylon fabrics. Polyamid 6.6 RIPSTOP 40, 38 and 32 g/m^2 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, main B-lines are yellow, main C-lines and D-lines are colored blue. The main brake lines are orange and 2D steering lines are blue. The main suspension loop on the bottom of the riser is reinforced and covered red. This is where the main carabineer should be hooked in connecting the risers to the harness.

The lines of the Colorado 2 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.

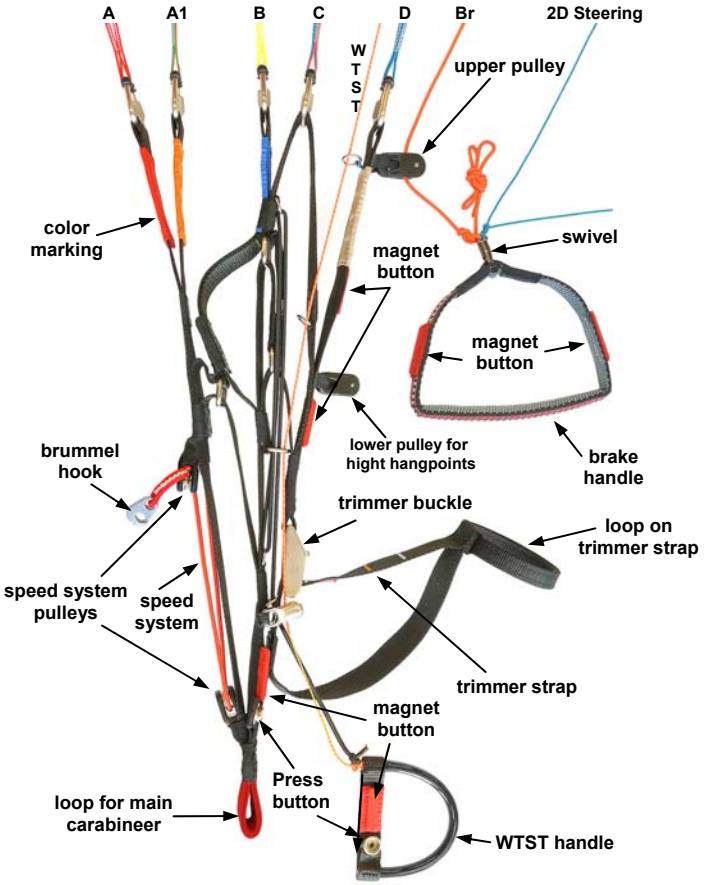
The Polyester sheathed Dynema and Aramid main lines have strengths from 90 kg up to 260 kg. The upper cascade lines have strengths from 50 kg up to 180 kg. The brake lines have strengths from 50 kg up to 90 kg. The main Dynema brake line has strenght 240 kg. Add up the strength of all the lines to understand the design of the Colorado 2 provides you with safety and confidence.

RISERS

The Colorado 2 is 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 are attached to A1 risers. The 3 B-main lines and the stabilizer lines are attached to the B-riser. 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 lower and classic attachment style paramotor and the lower one for higher attachment style paramotors.

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.

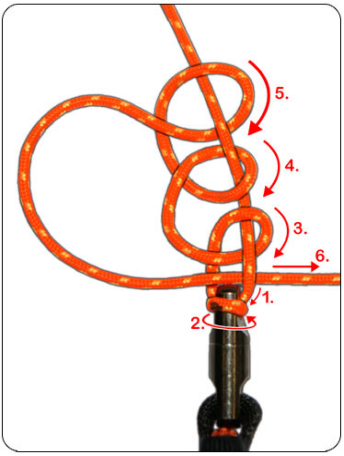
Riser`s scheme



Brake handles:

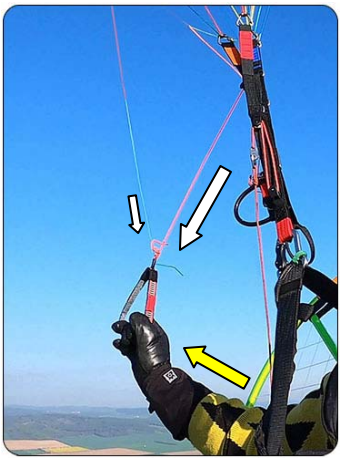
Special semi rigid brake handles are equipped with swivels and two neodymium magnets. Strong neodyme magnets hold the brake handles perfectly to the D risers. Attaching and releasing the brakes from the risers work very easily and quickly during flight. This minimises the danger of getting them caught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

Brake toggle (2D Steering)



Knot

2D Steering:



2D steering is quite different from classic steering system. It allows the pilot to control the glider more precisely. By pulling the steering toggle and simultaneously moving the hand away from the body or closer to the body, the amount of buoancy, degree of bank in a turn or rate of descent in a turn can be easily controlled. Any pilot with a sense of precision in glider control will appreciate the possibilities this system provides. The 2D system offers a lot more precise control of the canopy, but at the same time the pilot needs to get used to the new controls and have to learn how to control the glider correctly. The pilot must spend some time to discover the possibilities of 2D system, train and perfect his own control technique.

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 (speed system in combination with released trimmers) increases.

In accelerated flight mode the Colorado 2 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 very similar to the main brake handles. The brake forces are a bit 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.

Speed system:

The Colorado 2 is equipped with a speed bar operated speed-system which returns automatically to the normal position when released. The speed system affects the A, A1, B and C-risers and changes the angle of attack. In normal flight all risers have an overall length of 50 cm without quick links. When the speed bar is pushed out with your feet, A-risers are shortened by up to a maximum of 14,5 cm and A 1 risers up to of 14,5 cm. The B risers by up to a max. of 7 cm. The C risers by up to a max. of 4 cm, and the D risers retain their original length. To use the speed system you have to attach the brummel hooks found on the front of the risers and connect them to the brummel hooks found on the speed bar. If your paramotor harness did not come with a stirrrup style speed bar contact your local dealer to purchase one. More detailed instructions can be found in the chapter "Setting up the Controls".

Trimmers:

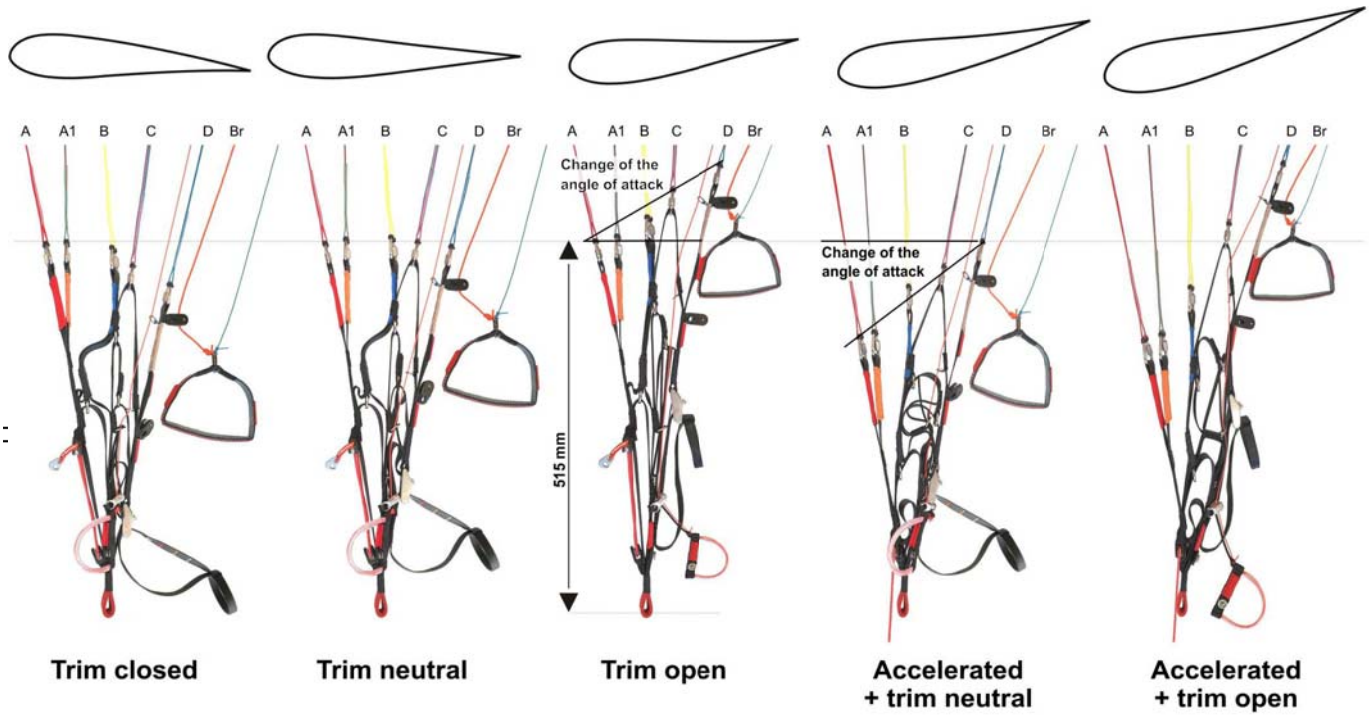
The Colorado 2 has a wide in flight speed range due to the range of different trimmer settings. The trimmers have a deceleration range of 4,0 cm and 11,5 cm of acceleration. On the faster setting (trimmers fully open and extended) the Colorado 2's speed increases. The wing is less sensitive to turbulence 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 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 Colorado 2 with closed trimmers (trimmers pulled all the way down) is around 40-44 km/h with a relatively low effort of the engine. This position is ideal for economy navigation tasks. With additional brake pressure the cruising speed is around 35-39 km/h. This will give you the best sink rate and requires the least amount of thrust from your engine for level flight.

The neutral trimmer position (marked with a white line) is the position where the risers are level. This is the most useful configuration for navigation and for precision ground tasks. The Colorado 2 still turns very well and restores plenty of energy flying around 43-47 km/h. It requires a little more RPM from your engine compared to the closed trimmer position. It is recommended to use this configuration when using the speed system!

With the trimmers fully open the speed is around 52-56 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 Colorado 2, fully release trimmers and push the speed bar out all the way by pushing on it with your feet. The maximum speed is around 62-66 km/h. Higher fuel consumption will result in this configuration.

WARNING! Do not use the brakes when the Colorado 2 is accelerated with trimmers all the way open or speed bar pushed all the way out.


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

MATERIALS

Tissue

(PORCHER SPORT,)

Top Sail - Leading Edge -	Polyamid 6.6 RIPSTOP, 38 g/m^2
Top Sail - Trailing Edge -	Polyamid 6.6 RIPSTOP, 32 g/m^2
Bottom Sail - Leading Edge -	Polyamid 6.6 RIPSTOP, 38 g/m^2
Bottom Sail -Trailing Edge -	Polyamid 6.6 RIPSTOP, 32 g/m^2
Ribs, Diagonals -	Polyamid 6.6 RIPSTOP, 40 g/m^2
Ribs, Diagonals -	Polyamid 6.6 RIPSTOP, 32 g/m^2
Reinforcement Ribs -	W382 Polyester 180 g/m^2

Lines

(EDELMAN+RIDDER+CO.)

Upper lines, brake lines - Aramid 8000/U-050, Breaking Load 50 kg
Upper lines, brake lines - Aramid 8000/U-070, Breaking Load 70 kg
Upper lines - Aramid/Polyester A-7343-075, Breaking Load 75 kg
Brake lines - Aramid 8000/U-090, Breaking Load 90 kg
Main lines mD1, Upper lines, Stabilo 0A - Aramid/Polyester A-7343-090, Breaking Load 090 kg
Main lines mC1, mD2, mD3, - Aramid/Polyester A-7343-140, Breaking Load 140 kg
Wing tip line - Aramid A6843-060, Breaking Load 60 kg
Main brake line - Dynema/Polyester A-7850-240, Breaking Load 240 kg

(ROSENBERGER TAUWERK, GERMANY)

A, B Upper lines - Dynema/Polyester PPSLS 180,Breaking Load 180 kg
2D Steering - Dynema/Polyester PPSL 191,Breaking Load 191 kg
Main lines mA1, mB1, mC2, mC3 - Dynema/Polyester PPSL 200,Breaking Load 200 kg
Main lines mA2, mA3, mB2, mB3 - Dynema/Polyester PPSLS 260,Breaking Load 260 kg

Attachment straps

(STUHA a.s., CZECH REPUBLIC)

STAP-POLYESTERBRIDLE 13 mm, Breaking Load 70 kg

Risers

(Mouka Tišnov, CZECH REPUBLIC)

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

Thread

(AMANN SPONIT ltd, CZECH REPUBLIC)

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

Rapid links

(ELAIR SERVIS, CZECH REPUBLIC)

NIRO TRIANGLE 200 - Max. Load 200 kg

Rigifoils

(SEABIRD METAL MATERIAL ltd, CHINA)

Rigifoils - Nitinol 0,6 mm

GLIDER CHECKLIST

Before delivery, as well as during production, each Colorado 2 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 Colorado 2 is a form of aircraft and should 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.

SETTING UP THE CONTROLS

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 Colorado 2 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 Colorado 2 glider comes from the MAC PARA factory with brake lines set to this position.

When flying paramotors 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!

Fitting the speed-system:

Most modern paramotoring harnesses have pulleys for speed system fitting. The Colorado 2 speed system is supplied with Brummel-hooks and must be assembled as per instructions.

Take your speed bar and make sure it is firmly attached to the foot stirrup (webbing or alloy bar) using a bowline or other non-sliding knot. Take off the Brummel hook on the speed bar cord if you haven't already done so. Hold the free end of the cord and run it through the pulley on each side of your paramotor harness. Next, lead the cord up to meet the Brummel-hooks on the riser of the paraglider. Firmly attach the Brummel hook on the end of the speed bar cord so that Brummel hooks can be attached to each other. Ensure both cords from the speed bar are equal length to avoid putting an unwanted turn in the glider.

The length of the cord leading to the foot bar stirrup should be adjusted so that it is easy to put your feet into the stirrup in flight but still short enough to allow full speed system travel. (The use of 2 stirrups in a ladder fashion can enable you to reach the full range if your legs are not long enough.)

Test your speed system for the correct length on the ground by hanging your paramotor to simulate the real flying position. While you are a few feet off the ground, attach your risers to your harness and have someone hold them while you try pushing the speed system checking for proper length and set up.

The full range of the speed system is reached when the 2 pulleys on the risers join together. Before launch, attach the glider's risers to the harness with the main carabineers first before attaching the speed system. Ensure that the speed system is untangled and operates freely before flying. There should be a spare inch or so before the speed bar activates the speed system. Remember that it is always safer to set the margin of play too big than too small.

FLYING THE COLORADO 2

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 Colorado 2.

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 harness 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

Put on the harness/paramotor with care and 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. Replace carabineers if any damage is visible or if you have accumulated 300 flying hours. Finally, connect the paraglider risers to your harness with the main self-locking carabineers. Check carefully that they are properly closed.

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

Forward Launch Technique

The Colorado 2 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.

The A-lines are identified by red coloured sleeves on the risers. Before take-off, place yourself in the centre of the glider while holding the A risers. Let the B, C and D risers fall into the bend of your arm. Continue holding the A risers with arms outstretched behind you. Pull up the canopy with good forward momentum. (The stronger the headwind the fewer run-ups you need plus less pull on the A’s to inflate your canopy). After the initial inflation you may need to keep applying forward pressure on the A-risers depending on the wind conditions. Do not pull down on the A’s.

1. Paragliding forward technique – Follow the above technique to get the glider overhead. As soon as the glider is above you, stop pulling on the A-risers. A good progressive run ensures your Colorado 2 will inflate and come up equally and quickly. If the canopy should surge forward, control it by gently braking. Next, do quick visual checks of the canopy looking upwards to ensure the canopy is completely open (otherwise, abort the take-off). Only then is the final decision to continue the launch. If anything doesn't feel completely safe, the launch should be aborted. If the glider feels solid and evenly inflated continue moving forward until the glider lifts you off. It is easier to take-off in a light headwind by applying the brakes slightly. After the take-off, gently release the brakes to gain forward momentum. Shortly after take off the brakes should be gently reapplied to stabilize the glider during cruising flight and possibly correcting for drift.

2. Paramotoring technique – Layout and start the inflation technique the same as stated above. Once the canopy is inflated up to the angle of about 80° degrees, open up the throttle to full power and lean back. This helps counter the engines thrust allowing it to push you forward rather than leaning forward towards the ground. Continue to run in an upright position. This is important. 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. Release the brakes to gain enough altitude to allow you to get into your harness safely.

Experienced paraglider pilots that start paramotoring have a tendency to lean forward with slightly applied brakes. When taking off with a paramotor you need to stand up straight and allow the thrust of the engine to push your body horizontally forward rather than diagonally down.

It is important to not get into the harness as soon as you leave the ground. Right after take-off you are relatively low to the ground. The possible danger is if the engine happens to quit or loose thrust you quickly will be put back on the ground. Not rushing into your seat/harness allows your legs to act as landing gear instead of the bottom of your paramotor.

The recommended technique of getting into your harness is to climb to a safe height into the wind and then gently throttle back before getting into the seat. If you need to use your hand to help you get into your harness, be sure to put the brake toggle on the magnet first to avoid it being sucked into the prop. Also note that properly fastened leg straps makes getting into the harness much easier. Check this before take-off in a simulator or with your paramotor instructor.

WARNING!! Do not jump or lift your legs immediately after or during your take off! This could have disastrous consequences when done with a paramotor if the wing has not reached the proper take off speed to create the necessary lift. Keep running, keep running and keep running until you are running through the air.

WARNING!! Do not attempt to get into the seat while holding the brake handles.

WARNING!! Do not use the forward launch technique in very strong winds. Make sure you don't pull the risers too much towards yourself or downwards as this can cause a frontal collapse or make an asymmetric collapse during take-off.

Reverse launch Technique

The Colorado 2 is easy to reverse launch.

The most important skill to perform the reverse launch successfully is to fully understand ground handling. You need to be able to keep the wing directly overhead and into wind while taking off on flat ground. When doing a reverse launch in strong winds the Colorado 2 can surge forward quickly or lift off sooner than desired. To avoid this, walk towards the canopy during inflation. We recommend pulling the trimmers down 2-3 cm from the neutral position.

To reverse launch the Colorado 2 in wind, get the canopy over your head by using the A and D riser method. Holding onto the D lines stop it from over shooting and guiding the A lines in the opposite hand help it come up. This stops you from applying both brakes and pushing your hands back towards the propeller.

Hold the A lines in the left hand along with the left brake handle and the throttle (if you have it on the left side), and the D lines in the right hand along with the right brake handle (and the throttle if you have it on the right side). Once the canopy is above your head you release the A and D risers then turn 180 degrees into wind while keeping the glider under control. Once you feel equal pressure and a stable canopy above you then you can accelerate. Once you are safely airborne, continue heading into the wind to gain enough height.

Do not try to climb too steeply by applying too much brake. The additional drag caused by brakes decreases actual climbing rate. If there are no obstacles present, it is safer to fly level for a while after take-off and gain some speed before converting it to height. As already mentioned, don`t try to get into the seat immediately after you leave the ground as you are still relatively low. Instead, continue into the wind, climb to a safe height, and then gently throttle back before getting into your harness/seat.

It is better to start to learn this A and D reverse technique without the paramotor. Once you practise a bit you can start trying it with the paramotor. Using this technique allows you to build a wall directly into wind while standing in the centre of the canopy.

When deflating the canopy on the ground in strong winds or aborting a launch, pull down on the C or D risers instead of the brakes. Using the brakes in strong wind will cause more lift. This could lift the pilot up off the ground and dangerously drag him/her back.

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.

Too much brake input during take-off is risky. Depending on the design and power of your paramotor unit, it is possible that you will notice engine torque moments while not sitting properly in your harness. Be ready to counter-steer with a brake input to correct turning tendencies and keep you flying straight. You also can compensate torque moments by adjusting cross bracing if present on your harness or by adjusting Colorado 2 torque compensator line on the opposite riser of the torque turn. Different settings of trims on each riser and shifting your weight to the opposite side of the turn tendency will help to keep the glider in a straight direction after take-off.

The reverse launch technique can take some time to master. Turning the wrong way can result in the pilot taking off with twisted risers. Practice the reverse launching technique on a training hill or slight slope first with your instructor to build up your confidence. Again, make sure your engine is off until you have practised enough to prevent the lines from getting sucked into the spinning propeller. If this does happen contact your nearest MAC PARA dealer for replacement lines or glider repair.

Wind	Trim settings	Launching technique & additional settings
under 1 (m/s)	Released for 1-2 cm.	**Forward launch** - start with lines under tension - try to minimize use of the brakes. - correct position of the wing by moving toward in appropriate direction rather than by using brakes - use of full thrust when canopy at 80°
1 - 3 (m/s)	Neutral	**Forward launch** - start with lines under tension - you can use brakes to correct the position of the wing during the run, but moving in the appropriate direction during the run is most effective technique. - use of full thrust when canopy at 80°
over 3 (m/s)	Neutral or closed for 1-2 cm	**Reverse Launch**

Flight

After take-off and applying full power the glider will be at a higher angle of attack. Some paramotoring configurations 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. Inexperienced paramotoring pilots tend to be especially prone to overreacting.

The Colorado 2 can reach speeds of 43-47 km/h on neutral setting depending on the weight of the pilot.

Always fly with sufficient clearance from the terrain.

With power off the Colorado 2 best glide rate is with open brakes. Flying the Colorado 2 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 Colorado 2 be done with trimmers set on or just below the neutral setting (the white stitching mark) This is where the Colorado 2 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 (10-15 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 Colorado 2 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 faster trimmer settings or when flying with a speed bar the brake pressure increases and the handling changes. When the trimmers are fully opened and the speed bar is pushed all the way forward, we recommend steering the glider using the torque compensator lines.

Some pilots with free-flying experience may have a tendency to keep the brakes slightly applied at all times. Such a technique, while quite reasonable on a free-flying wing, is not advisable for reflex gliders. When you apply the brakes with released trimmers and full speed bar the wing will collapse because it loses its reflex characteristic.

Warning!!! On faster trim settings with fully accelerated speed bar do not touch the main brakes! Doing so will result in major collapse! In flight mode use only WTST brakes for steering of the glider.

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. Do not hesitate to use thermals in order to gain some altitude and save fuel.

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

Accelerated flight (speed bar applied)

When flying with the speed system engaged the angle of attack is lower and the glider increases flight speed. In contrast to most paragliders it does not decrease wing stability; in fact the reflex gliders seem to counter turbulence even better. To use the speed system and accelerate the glider, simply place your feet on the stirrup and push forward in a horizontal plane. If you feel a loss of back pressure while flying with the speed bar engaged, this is a warning that the canopy is probably about to collapse.

Release the speed system immediately by releasing the pressure on the speed bar. Do not use the speed system in very turbulent conditions, close to the ground or near other airspace users. Always fly with sufficient clearance from the ground/obstacles and always keep the brake handles in your hands!

Steering - turns:

The Colorado 2 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 Colorado 2 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.

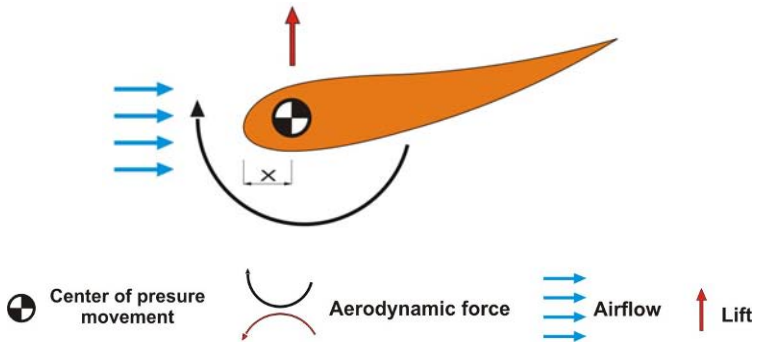
Warning!! As already noted, do not apply brakes when fully accelerated with trimmers fully opened! Braking increases lift near the trailing edge. The main lift point moves backwards causing a loss in stability leading to big frontal or side collapse. Quickly letting off the throttle after being fully accelerated (maximum speed bar and trimmers open) 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.

When flying with maximum speed-bar engaged and fully opened trimmers, we strongly recommend steering with WTST (wing tip steering) handles. At first, learn to fly using the speed system with the trims in neutral position.

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

Released trimmers without brakes

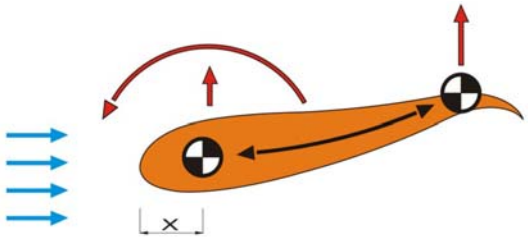
Preferred setting for fast and safe flying. The centre of gravity of the air foil is moved forward, the wing has higher resistance to collapses. Pitching moment decreases.



Released trimmers with brakes applied

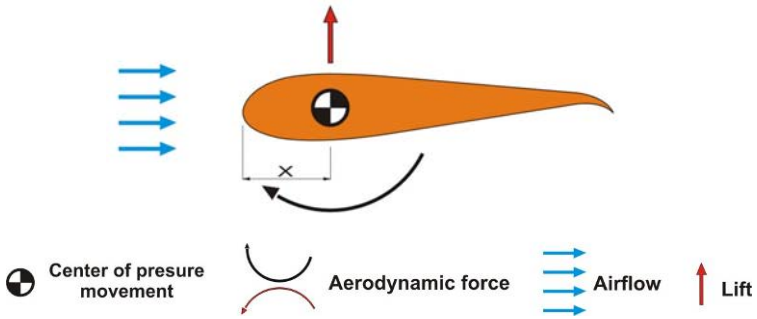
Even slight brake input (especially on full speed bar) produce lift close to the trailing edge. The centre of gravity of the airfoil is moved back and the higher pitching moment significantly decreases the stability.

Warning!! Especially in turbulence this can lead to a collapse on full speed with trimmers released! 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 Colorado 2. 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 Colorado 2 is very easy to land. The final leg of the landing approach must be into the wind. There are two methods in landing a paramotor. 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 your feet 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. Your instructor will assist you to understand how to properly time your brake pull (also called a flare). 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. In no wind conditions, be prepared to run a few steps after touchdown. Then pull the brakes few times dynamically (like a fluttering bird). This stops the canopy over your head and gives you time to turn and put the glider gently on the ground. Do not apply full brakes before you are safely on the ground. Do not turn unless the propeller stops turning.

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.

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.

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 Colorado 2 is not suitable for towing.

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

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

EXTREME FLYING MANOEUVRES

WARNING!! All the critical flight conditions described here require thorough knowledge. They should only be carried out during safety training courses (SIV) under proper guidance and supervision. Under no circumstances can the information below be taken as manual for practising advanced manoeuvres.

This section describes flying conditions which can be deliberately induced or can develop unintentionally due to turbulence. Pilot error can also be responsible for unwanted circumstances. Any pilot who flies through turbulence will face special flight conditions at some point in their flying career. Be aware of these flight manoeuvres and prepare for them by SIV (safety training over water) with proper instruction. We expect you are an advanced paramotoring pilot and you already have the proper experience. Mastering these flying conditions significantly improves your active flight safety. Keep in mind that all disturbances of the canopy can increase the sink rate by 2 - 10 m/sec depending on the degree of disturbance/collapse. Carrying out these manoeuvres wrong may lead to a sudden drop in altitude, a crash or even death.

Asymmetric collapse

A negative angle of attack can cause all or part of the leading-edge of the Colorado 2 to collapse (e.g. in very turbulent air). The Colorado 2 will re-open spontaneously from closures of up to 50%. The time this takes with the associated height loss can however be drastically reduced by appropriate action by the pilot. Applying opposite brake on the inflated side to stop the turning movement of the canopy will help the canopy regain proper flight. If you react immediately with 30% brake on, the open side should hold the canopy on a straight course.

In the event of a big collapse, this braking should be applied very carefully to avoid stalling the remaining inflated wing. The pilot's correction for maintaining direction can be aided by pumping out the deflation; a slow, long pumping action of the brake of the deflated side of the wing helps the canopy to re-inflate. If the pilot does not take corrective action the canopy can enter a stable spiral dive.

“Cravat” / Line-over:

In the event of some lines becoming tangled during flight (caused by whatever), the following action is recommended:

Stabilize the glider by gently applying the opposite brake. Please be aware that in this condition the brake pressure can be higher and the brake travel shorter.

Without pilot input, a line-over will result in a stable spiral dive.

Here are the various options to untangle a line-over:

- pumping the collapsed side.

-pulling the stabilizer line or a sharp pull on the D riser can sometimes solve the problem.

Attention! If these manoeuvres fail or if in any doubt, the pilot should instantly use their emergency reserve parachute system!

Frontal Collapse:

Frontal collapses provoked at higher speeds can lead to extremely deep collapses. Recovery requires short and equal application of both brakes. When experiencing a very large front tuck, a frontal rosette can occur (the wingtips move forwards: forming a horseshoe shape). Short and gentle braking can avoid this.

A quick recognition of the situation and a quick reaction by braking on both sides helps the recovery and limits the altitude loss.

Parachutal stall (deep stall):

A parachutal stall can be caused by having the glider fly too slowly. The most common cause is from pulling too much brake, however, porous canopies (UV influence) or canopies out of trim (stretched or shrunken lines) are much moresusceptible to a parachutal stall. Gliders in poor condition should not be flown. This is the reason why regular checks should be carried out on your glider. A wet canopy or temperatures below zero centigrade (0°C) may also cause a stable parachutal stall. When releasing the brakes the Colorado 2 will spontaneously recover from a parachutal stall within 2-3 seconds. If the canopy remains in a parachutal stall, it is sufficient to release trims or to push the accelerator.

Attention! If brakes are applied while in a parachutal stall, the glider may suddenly enter a full stall!

Full-stall:

A full stall practically never occurs. It happens only as a result of serious neglect or intentional action of the pilot. To avoid a full stall you have to be careful when flying at low speeds until fully familiar with brake operation. The Colorado 2 recovers spontaneously in the initial phase of stall, otherwise use standard procedures.

To recover from a full stall, smoothly release both brakes simultaneously until 90% of leading edge reopens, then release brakes rapidly. The glider ends the full stall on its own without surging forward violently.

WARNING!! If the brakes are released rapidly and asymmetrically, the glider may surge almost 90° and suffer an extensive asymmetric collapse.

The danger of overcorrecting and overreacting exists during all extreme flight manoeuvres. Any corrective action must be gentle and controlled. Proper training and experience is required to gain a good feel for the glider! Always receive proper training.

Spin (or negative spin):

Normally it does not occur. You have to be careful when flying at low speeds until fully familiar with brake operation. A negative spin can happen by pulling down the brake on one side too fast or too hard. During a spin the canopy turns relatively fast around the centre section of the canopy while the inner wing flies backwards (hence the term negative).

There are two usual reasons for an unintentional spin:

- One brake line is being pulled down too far and too fast (e.g. when inducing a spiral dive in slow setting)
- When flying at low speed the pilot pulls opposite brake too hard to try to compensate for the engines torque.

To recover from an unintentional spin, the pulled down brake line should be immediately released as soon as a spin is suspected. The canopy will accelerate and return to its normal straight and stable flying position without losing too much height. If the spin is allowed to develop for some time, the glider will surge far forward to one side resulting in a dynamic asymmetric collapse or a cravat. Gently apply the brakes to the side that is shooting forward to avoid the side/central collapse or the possibility of a cravat (one of the tips becoming entangled in the lines).

WARNING!! If you are LOW and are in an unintentional spin, or if the canopy is caught in a cravat - THROW YOUR RESERVE.

Wingover:

To induce a wingover the pilot flies consecutive alternating turns to gradually steepen the angle of bank. During wingovers with a high bank angle, the outside wing begins to unload. Continually increasing the angle of bank must be avoided to avoid dynamic collapses.

WARNING! Full-stall, spin and wingovers (over 90 degree angle of bank) are prohibited aerobatic manoeuvres and may not be performed during normal flying. Incorrect recovery procedures or overreaction of the pilot may have dangerous consequences!

Attention! The Colorado 2 is not designed to be used for aerobatics.

Alternative (emergency) steering:

If for some reason it becomes impossible to control the Colorado 2 with main brake lines, the WTST handles or D-risers may be used to steer and land the canopy safely.

Attention: When using the D-risers the brake range is much shorter (10-15 cm) then with the brakes. It is also possible to control the direction of the flight by pulling on a stabilizer line or by weight-shifting.

Spiral dive:

Attention! Set trim setting in slow or neutral and turn your paramotor off when executing spiral dive.

A spiral dive is the fastest way to lose altitude; however, the very high G-forces make it difficult to sustain a spiral dive for long. It also places high loads on the pilot and glider. By tensing ones abdominal muscles and a higher body tension you can to some extent resist the high G-forces. Don't forget proper breathing to keep the blood flowing to avoid blacking out. As soon as you feel any slight dizziness or impaired vision the spiral should be exited immediately.

The Colorado 2 has a very effective spiral dive. This allows rapid descent without stalling. To enter a spiral dive the pilot should weight-shift to one side while slowly pulling the brake gradually on the same side. During a spiral dive the angle of bank can be controlled by increasing or reducing the amount of inside brake. When spiral diving the Colorado 2, it is recommended that the outside brake be lightly applied. This helps stabilize the wing and enables an easier and safer exit from the spiral. To exit, release the inside brake slowly. At higher sink speeds or if the pilot keeps his weight on the inside, the wing can stay in a continued deep spiral and has to be actively exited. This is done by weight shifting to the outside and gently applying brake to the opposite side.

WARNING!! Nearly all gliders will have a tendency to stay in the spiral if the sink-rate exceeds approximately 15-m/s depending on weight-shifting, wing loading and G-force. In fact most gliders need a counter-input to end a turn.

Attention! Due to energy retention, the glider will climb a lot after a deep spiral-dive release. If you apply inner brake and decelerate the glider for two or three turns, big pendulum effects can be avoided.

WARNING!! Practise spiralling with caution and lower sink-rates to get a feel for the gliders behaviour. A pilot who is dehydrated or not accustomed to spiralling can lose consciousness in a steep spiral dive!

WARNING!! Never do big ears in a spiral! This manoeuvre can lead to a smaller number of lines carrying an excessive load multiplied by the centrifugal force. It could lead to damage of the lines and or the paraglider itself.

Big ears:

There is a lot of load on the “A’s” performing big ears especially on the faster trim settings. We do not recommend using big ears as descent technique under power. With a hard pull on the outermost A-lines there is higher risk of collapse. A spiral may be a more efficient way to get down.

When in big-ears without power, the horizontal speed is higher than the sink rate, unlike a spiral dive or a B-line stall. This rapid descent technique is used to quickly and horizontally exit a dangerous area in the desired direction. In order to collapse the outside wing tips called big ears pull down the outer most A-lines.

This will tuck the fabric on the outside part of the wing and start a stable descent. Keep holding the brake handles along with the outside A1-risers in your hands. By braking on one side and weight-shifting, the canopy remains steerable.

In order to increase the sink rate as well as the horizontal speed, this manoeuvre should be done together with use of the speed system. Apply the speed system after big ears are induced (step into the speed-bar before you grab the outer A1-risers). Big-ears substantially reduce the risk of canopy stability problems in turbulent air. To exit Big-ears release the A1-risers. The canopy will recover by it self. If not, or to quicken the recovery, the pilot can gently apply brakes to the glider.

WARNING! Never do big-ears in spirals. This may drastically reduce the number of lines taking the already high loads causing structural failure.

B-line stalls:

As there is a lot of load on the “B’s” we do not recommend using B-Stall as a descent technique under power. Performing B-Line stalls on any glider weakens the fabric by putting unnecessary strain on the lines. It could deform the quality of airfoils and weaken it.

GOLDEN RULES

Summary:

For all extreme manoeuvres and rapid descents please note:

- First practise manoeuvres with an instructor during safety training.
- Before inducing any manoeuvre the pilot must check that there are no other airspace users below him.
- During the manoeuvre you must have the canopy within your view.
- Always carry out full pre-flight checks before launching.
- Never place your paramotor 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 helmet before getting into the harness.
- 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 Colorado 2 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 one year, 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 Colorado 2 is delivered with a stuff-sack, 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 100 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.

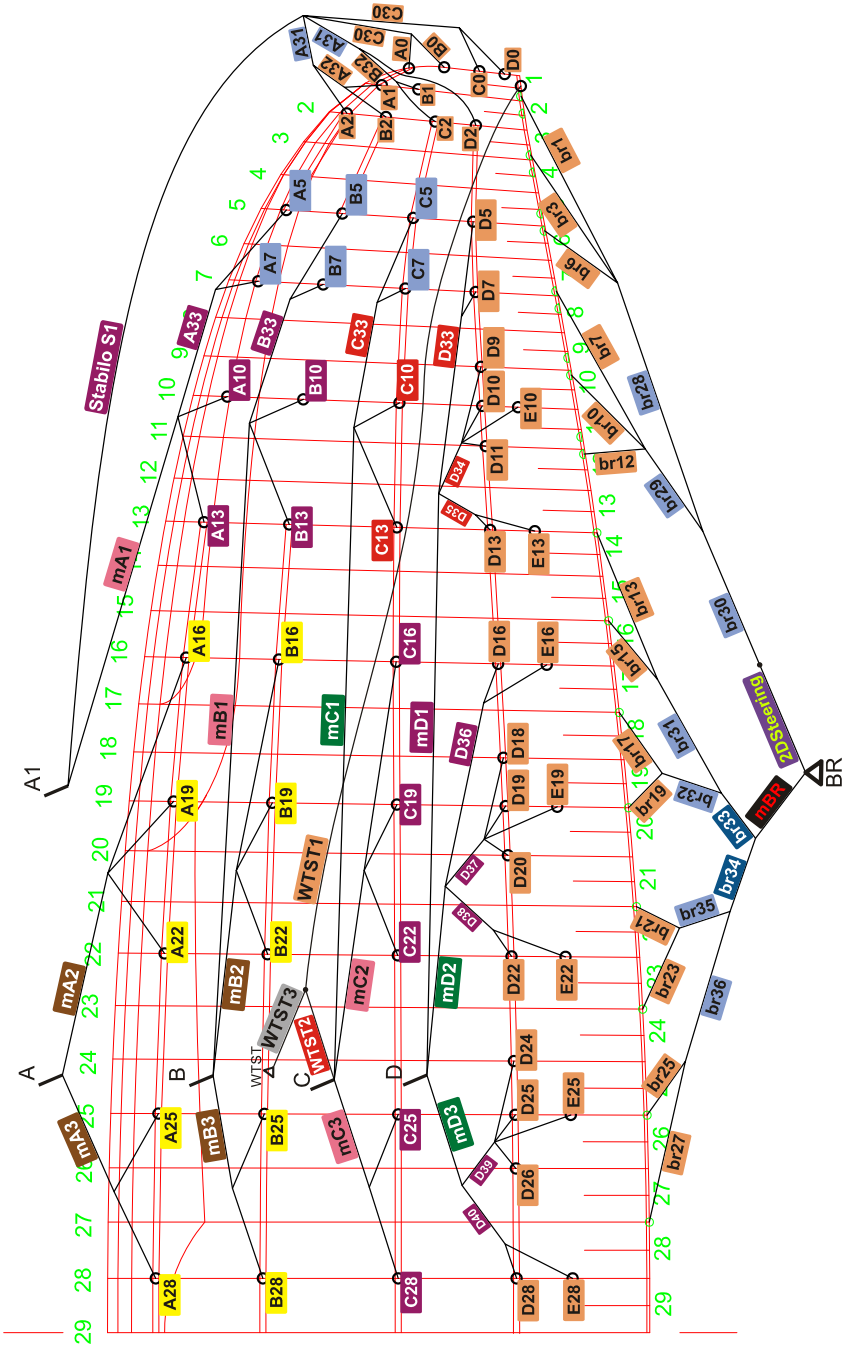
COLORADO 2 LINE PLAN

Line descriptions:

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

Line strengths in colors

LINE PLAN – SCHEME



RISER LENGTHS

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

Riser lengths [mm]	A	A1	B	C	D
Trimmers closed	515	515	505	495	475
Trimmers neutral	515	515	515	515	515
Trimmers fully released	515	515	545	585	630
Trimmers closed + Accelerated	370	370	445	455	475
Trimmers neutral + Accelerated	370	370	445	475	515
Trimmers released + Accelerated *	370	370	445	530	630

* Read more on the page 20.

Brakeline lenghts	Colorado 2						
	18	20	22	24	26	29	31
Low attachment on PPG harness	3,26 m	3,40 m	3,59 m	3,75 m	3,89 m	4,10 m	4,30 m
High attachment on PPG harness	3,42 m	3,56 m	3,75 m	3,91 m	4,05 m	4,26 m	3,46 m

FULL LINE LENGTHS

Colorado 2 - 18 (XXS)

Center	A	B	C	D	E	Brakes
1	6266	6205	6268	6410	6508	6590
2	6248	6188	6251	6403	6489	6445
3	6277	6218	6277	6392	6507	6350
4	6259	6202	6257	6448	6473	6340
5	6310	6256	6306	6411	6497	6310
6	6301	6251	6277	6410	6448	6275
7	6199	6155	6175	6385	6320	6285
8	6141	6101	6127	6416		6360
9	6123	6082	6101	6421		6065
10				6372		5935
11				6304		5875
12				6253		5730
13				6237		5630
14				6191		5615
15	5852	5817	5849	6151		
16	5769	5796		5920		

Colorado 2 - 20 (XS)

Center	A	B	C	D	E	Brakes
1	6557	6492	6558	6707	6810	6915
2	6537	6474	6540	6699	6790	6760
3	6568	6506	6567	6688	6809	6665
4	6549	6488	6546	6747	6774	6650
5	6602	6546	6598	6708	6799	6620
6	6593	6540	6567	6707	6747	6585
7	6485	6439	6460	6680	6611	6595
8	6423	6382	6409	6713		6675
9	6404	6362	6381	6719		6395
10				6667		6260
11				6596		6195
12				6541		6040
13				6524		5935
14				6476		5920
15	6119	6082	6115	6434		
16	6031	6059		6190		

FULL LINE LENGTHS

Colorado 2 - 22 (S)

Center	A	B	C	D	E	Brakes
1	6867	6799	6868	7025	7133	7280
2	6847	6780	6849	7016	7112	7120
3	6879	6814	6878	7004	7132	7015
4	6859	6795	6856	7066	7095	7005
5	6915	6856	6910	7025	7121	6970
6	6905	6849	6878	7024	7067	6935
7	6792	6743	6765	6996	6924	6945
8	6726	6682	6711	7031		7025
9	6706	6661	6681	7036		6725
10				6983		6580
11				6908		6515
12				6851		6350
13				6833		6240
14				6782		6225
15	6406	6366	6402	6737		
16	6313	6343		6481		
17	6299	6293	6337	6395		

Colorado 2 - 24 (M)

Center	A	B	C	D	E	Brakes
1	7143	7072	7143	7307	7419	7585
2	7122	7053	7123	7298	7397	7415
3	7155	7087	7154	7286	7418	7310
4	7134	7068	7131	7350	7380	7295
5	7193	7131	7187	7307	7407	7265
6	7182	7124	7154	7306	7350	7225
7	7064	7013	7035	7277	7202	7235
8	6995	6950	6979	7313		7320
9	6975	6928	6948	7319		7005
10				7263		6860
11				7185		6785
12				7125		6620
13				7107		6505
14				7053		6485
15	6660	6619	6656	7006		
16	6564	6595		6739		
17	6550	6543	6589	6649		

Colorado 2 - 26 (L)

Center	A	B	C	D	E	Brakes
1	7419	7345	7419	7588	7706	7890
2	7397	7325	7398	7579	7683	7715
3	7432	7361	7430	7567	7705	7605
4	7410	7341	7406	7633	7665	7590
5	7471	7406	7464	7589	7693	7555
6	7450	7389	7429	7588	7633	7515
7	7327	7274	7306	7558	7479	7525
8	7265	7217	7247	7595		7615
9	7243	7194	7215	7601		7300
10				7543		7145
11				7461		7070
12				7399		6895
13				7380		6775
14				7324		6755
15	6915	6873	6911	7276		
16	6815	6847		6997		
17	6800	6793	6841	6904		

Colorado 2 - 29 (XL)

Center	A	B	C	D	E	Brakes
1	7763	7686	7763	7941	8064	8295
2	7741	7665	7742	7931	8040	8110
3	7777	7703	7775	7918	8063	7995
4	7754	7682	7749	7988	8021	7980
5	7818	7751	7811	7942	8051	7945
6	7805	7742	7774	7940	7988	7900
7	7676	7621	7645	7908	7825	7910
8	7601	7551	7583	7948		8005
9	7578	7527	7549	7954		7665
10				7893		7505
11				7807		7425
12				7742		7240
13				7722		7115
14				7664		7095
15	7234	7189	7229	7613		
16	7129	7162		7319		
17	7113	7105	7156	7221		

Colorado 2 - 31 (XXL)

Center	A	B	C	D	E	Brakes
1	8108	8027	8108	8293	8423	8690
2	8084	8005	8085	8283	8398	8495
3	8123	8045	8120	8269	8421	8375
4	8099	8023	8093	8343	8377	8360
5	8166	8095	8158	8294	8408	8320
6	8152	8085	8120	8293	8342	8275
7	8017	7959	7984	8259	8172	8290
8	7938	7885	7918	8301		8385
9	7914	7860	7883	8307		8030
10				8243		7860
11				8153		7780
12				8085		7585
13				8064		7455
14				8003		7435
15	7552	7505	7548	7950		
16	7442	7477		7642		
17	7425	7418	7471	7539		

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.

CHECKS

Name	Company	Date	Signature & Stamp

PARAGLIDER & SERIAL NUMBER

Paraglider type:

Serial number:

Manufacturing date: .....

Commisioning date: .....

TECHNICAL SPECIFICATIONS

Colorado 2 - Paraglider for Powered F Size		18 (XXS)	20 (XS)	22 (S)	24 (M)	26 (L)	29 (XL)	31 (XXL)
Zoom flat	[%]	83	87.5	92	96	100	105	110
Area flat	[m2]	17.88	19.88	21.97	23.92	25.96	28.62	31.41
Area projected	[m2]	15.78	17.53	19.38	21.10	22.90	25.25	27.71
Span flat	[m]	10.01	10.55	11.10	11.58	12.06	12.66	13.27
Aspect ratio flat	-	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Root cord	[m]	2.25	2.37	2.49	2.6	2.71	2.85	2.98
Cells	-	58	58	58	58	58	58	58
Weight	[kg]	4.2	4.5	5.0	5.2	5.4	5.7	6.1
Weight range powered*	**[kg]**	**80-120**	**84-125**	**95-130**	**105-145**	**115-160**	**128-175**	**140-190**
Weight range powered*	[lbs]	176-264	185-275	209-286	231-319	253-352	282-385	308-418
Recommended weight range for PPG foot launch *	[kg]	80-105	84-110	95-115	105-130	115-145	128-160	140-175
Recommended weight range for PPG foot launch *	[lbs]	176-231	185-242	209-253	231-286	253-319	282-352	308-385
Min. speed	[km/h]	25 - 27	25 - 27	25 - 27	25 - 27	25 - 27	25 - 27	25 - 27
Speed trimmers closed	[km/h]	40 - 44	40 - 44	40 - 44	40 - 44	40 - 44	40 - 44	40 - 44
Speed trimmers open	[km/h]	52 - 56	52 - 56	52 - 56	52 - 56	52 - 56	52 - 56	52 - 56
Top speed (acc.+trim open)	[km/h]	62 - 66	62 - 66	62 - 66	62 - 66	62 - 66	62 - 66	62 - 66

* powered pilot equipped = weight naked + approx. 35-40 kg (-55kg by trikes)

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