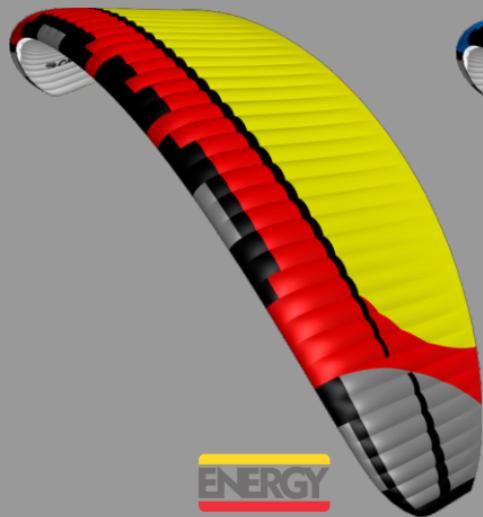
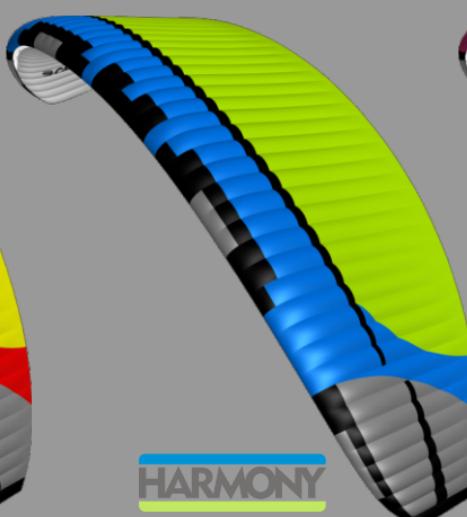




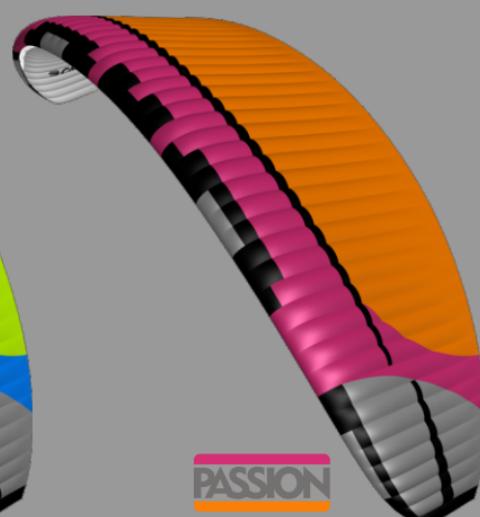
V .05.11.2018



ENERGY



HARMONY



PASSION

DUDEK

user manual

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Congratulations!

We are pleased to welcome you among the growing number of DUDEK PARAGLIDERS pilots. You've become a proud owner of a sport paraglider, designed according to recent trends.

Intensive development, application of the modern production methods and thorough testing resulted in a friendly behaving paraglider, offering the pilot a lot of fun combined with great performance.

We wish you many enjoyable and safe flying hours.

Please read this manual carefully and note following details:

- The purpose of this manual is to offer guidelines to the pilot using the paraglider. By no means it is intended to be used as a training manual for this or any other paraglider.
- You may only fly a paraglider when qualified to do so or when undergoing training at an accredited school.
- Pilots are personally responsible for their own safety and their paraglider's airworthiness.

- The use of this paraglider is solely at the user's own risk! Neither the manufacturer nor dealer do accept any liabilities involved.
- This paraglider on delivery meets all the requirements of the EN 926-1 and 926-2 regulations or has an airworthiness certificate issued by the manufacturer. Any alterations to the paraglider will render its certification invalid.
- Other documents concerning this paraglider can be found on attached pendrive or on our website: www.dudek.eu.



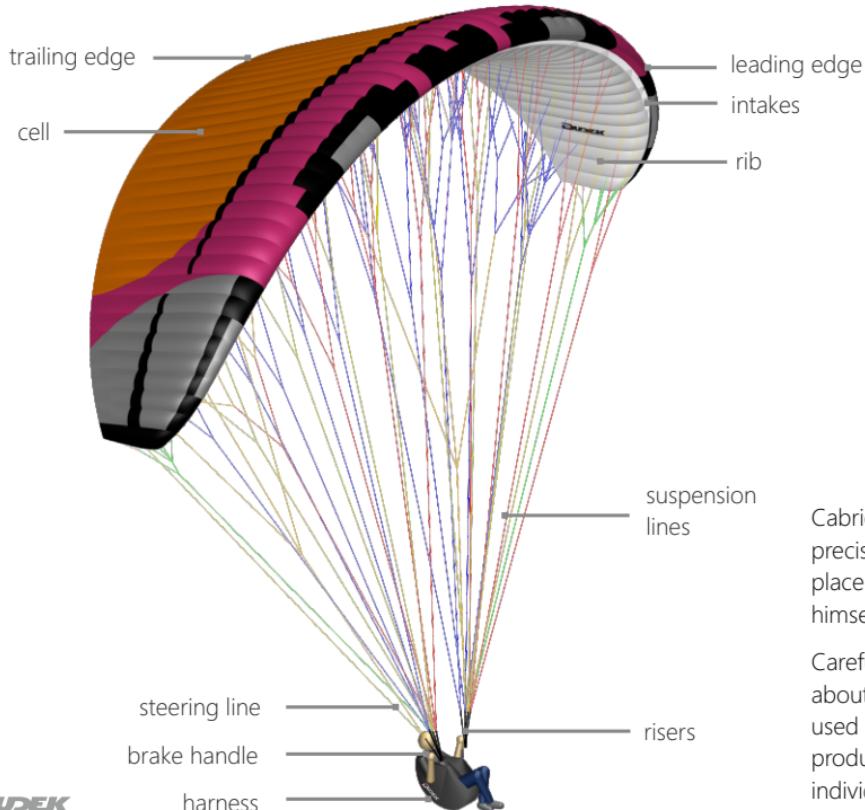
NOTE: Dudek Paragliders warns that due to the constant process of development the actual paraglider may differ slightly from the one described in the manual. However, those differences must not affect the basic design parameters: technical data, flight characteristics or strength. In case of any doubts contact us please.

For whom the Cabrio?

The Cabrio is a wing dedicated for carrying considerable loads. It's ideal for two-seater trikes, but equally well functions as one-seater trike wing and a foot launched PPG tandem.

It's a tandem wing both for professionals and leisure pilots. The Cabrio features easy launch, precise steering and highest level of passive safety, while retaining glide ratio of single-seaters.

The Cabrio is our first design originally dedicated for paramotor tandems, especially heavier two-seater trikes (PPGG). Earlier we were simply adjusting already existing wings for heavier loads, resulting in "Cabrio" versions of the original designs. Now, seeing the ever growing number of paramotor tandem enthusiasts, we've created the real CABRIO - not an add-on for other designs, but a truly uncompromising paraglider, from the onset created to fulfill specific needs of the PL2 pilots.


B3D
 Ballooning 3D

MR
 Mini-Ribs

ELR
 Easy Launch Riser

TR
 Trimmers

ACS
 Auto Cleaning Slots

DRA
 Dudek Reflex Airfoil

CSG
 Canopy Shape Guard

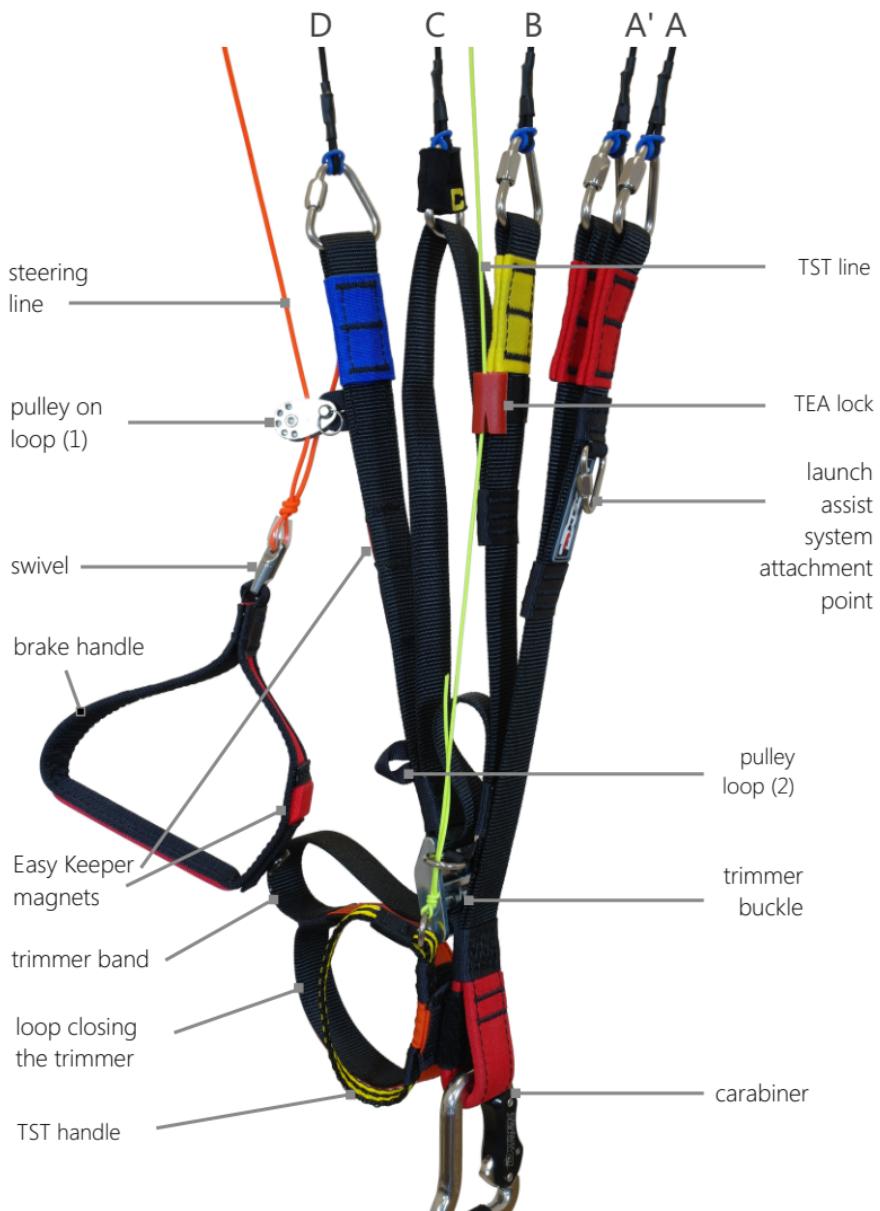
LR
 Laser Technology

FET
 FlexiEdge Technology

SN
 Shark-nose

Cabrio is produced in new technology, utilizing capabilities of precise laser cutter. All stages of the production process take place as our Polish plant under close supervision of the designer himself, thus ensuring highest European quality.

Careful selection of modern fabrics and design solutions brings about great strength and durability of the canopy. All materials used come from marked production batches, and each production step can be verified down to identification of individual worker and controller.



For the Orca 4 we have chosen four-way risers equipped with:

- ELR (Easy Launch Riser) - system. It is a specially marked A riser (with red cover)
- trimmer with replaceable (in case of deterioration) regulation strap, affecting the B, C and D risers.
- different levels of the pulleys, to be used depending on the hangpoint level;
- TST (Tip Steering Toggle) - additional mini handles for stabilo steering, connected to TST line.
- TEA (Torque Effect Adjuster) - eliminates the engine torque effect, shifting paraglider contrary to propeller turn direction. The TEA system is Adjustable.



Easy Launch Riser



Trimmers



Tip Steering Toggles



Torque Effect Adjuster

C - neoprene black

D - blue (needed to keep the glider down in strong wind – aborted launch).

For quick and easy recognition in emergency, some of the risers are distinguished with coloured covers as follows:

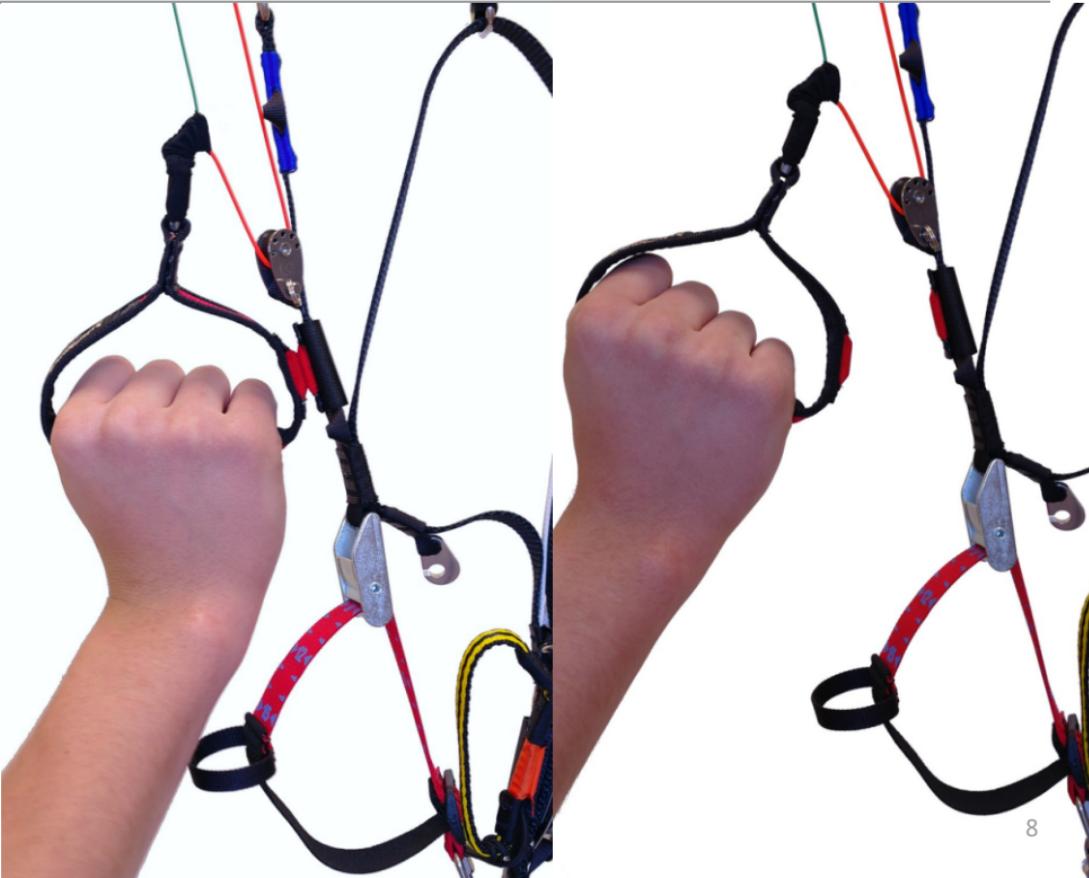
- A - red (used for launching)
- A' – red (used for big ears),
- B - yellow (used for B-stall),



Easy Keeper

Easy Keeper is our indigenous way to hold the brake handles at the risers by using strong neodymium magnets. It keeps the handles firmly at the risers, while both attaching and releasing goes smoothly and easily.

The system allows for easy placing the brake handles on risers during flight, when they are not used, thus minimizing the danger of getting into running propeller.



TCT

Triple Comfort Toggles

Addressing different needs of our clients we have created a TCT system - Triple Comfort Toggle, making it possible to have your brake handles in rigid, half-rigid or soft configuration without need to purchase additional handles.



The soft handle is obtained when no insert is used.



Operation

It's pilot responsibility to choose a canopy matching his skills.

Dudek Paragliders cannot take responsibility for a wrong choice, but we are always ready to advise you – just contact us.

Weight range

Each size of the canopy is certified for specific weight range, meaning total take-off weight including the pilot, harness, equipment and the canopy itself.

We advise flying the paraglider in the middle of weight range. However, if you most often fly in weak winds you can consider flying in lower part of the weight range, and in higher part when in strong winds.

! **CAUTION:** Check your real take-off weight! Some pilots calculate their take-off weight by just summing up catalogue numbers, e.g.: harness 5 kg + canopy 6 kg + pilot 89 kg = ca. 100 kg. In reality your actual take-off weight can be umpteen kilograms more. Most often we forget the clothing, electronics, backpacks, sometimes even such basic things like fuel or rescue chute weight are omitted!

Steering lines adjustement

Cabrio risers are shorter than in most paragliders, thus alleviating potential problem with different hangpoints. There are two places to fix the steering lines pulley – high, and middle. On the main steering line there are two points marked – lower and higher, indicating where to fix steering handle depending on pulley placement.

! **CAUTION!** Before first use check whether steering lines and pulleys are set for higher or lower hangpoint, and adjust them to your preferences if necessary.

When flying with low hangpoint (or without paramotor) fix the pulleys to upper loops on the risers, and the steering handles on upper positions marked on the steering lines (so that steering lines are effectively shortened).

General rule is simple - higher hangpoints require longer brake lines, lowerhangpoints require shorter lines.

Before you take your Cabrio in the air, we strongly advise to try out everything first. Hang up the entire PPG unit with ropes (in case of a trike it is enough to clip the risers in), sit in and have someone pull up the risers. You must make sure that in flight you will always be able to reach the brake handles, even if the airflow blows them away.

While being suspended in this way, you have a perfect opportunity to adjust the launch assist system too (if present). It should engage the A risers, shortening them when the canopy remains behind the pilot.

During inflation its effect should gradually diminish and finally disappear completely as the canopy arrives overhead. If you think the paraglider is rising up too rapidly, lines or straps of assist system should be lengthened.

An additional way to check the whole configuration out is to visit take-off site in steady winds. Inflate the canopy and take it up over your head. When it stabilises, check that the brakes are loose and are not pulling the trailing edge. There should be a spare inch or so before they activate.

Remember that it is always safer to set the margin of play too big than too small. And, most important, the setting must always be symmetrical.

Other systems

This paraglider has no other systems which can be adjusted, exchanged or removed.



Additionally mounted straps shorten A risers during inflation (left photo). When the canopy is ready at 12 hrs position, A risers go back to their original length (assist system ceases to work - right photo)

Pre-flight check

Having chosen a place to launch accordingly to the terrain as well as wind speed and direction clear it of any obstacles that could damage your canopy or tangle in the lines.

After laying out your paraglider in a horseshoe directed against the wind following checks must be made:

- canopy, lines and risers condition. Do not launch if the slightest damage is noticed,
- the paraglider should be arranged so that the centre section A-lines will strain earlier than the outer ones. This ensures easy and symmetrical launch,
- the leading edge should stay taut and even,
- all lines and risers should be separated. Make sure they are not tangled, and checked against catching anything. It is equally important to check the brake lines. They must be firmly attached to the brake handles and run freely through the pulleys to the trailing edge,
- make sure the risers are not twisted,
- it is very important to check that no lines are looped around the canopy. The so-called "line-over" may have disastrous consequences during take off.

- always put on and fasten your helmet before clipping in to the harness,
- make sure that all quick links (maillons) of the risers are tight,
- Check main carabiners. They must be properly mounted, closed and locked.
- remember to set the trimmers symmetrically.

When launching with a paramotor, additionally check if:

- the trimmers are set symmetrically?
- TST handles are fasten to the risers?
- nothing will collide with the propeller?
- full engine power is available?

Free Flights

Although the Cabrio according to its design book is a PPG wing, it behaves surprisingly well as a classic tandem paraglider too and can be used as such without any changes.

The essential difference between Cabrio and classic paragliders means that due to its increased tuck-resistance (both during start and

flight) and greater speed range it can be safely flown in strong conditions. Generally (and paradoxically from traditional point of view) the faster you fly, the safer is your flight.

Due to considerable passenger/pilot inertia, most tandem flights usually start with a classic straightforward launch. The alpine (reverse) launch is executed only when the wind speed makes normal start impossible.

For the launch closed trimmer position is recommended.

Classic (forward) launch

In case of forward launch we recommend that after laying out the wing all lines be taut, without unnecessary play. The paraglider is pulled up with A risers only. The optimal trim setting is fully closed. Applying steady pressure on the A risers move forward. The wing practically does not overshoot, so the front collapses that otherwise happen quite often at launch, occur rarely with the Cabrio. Instead it kind of waits for you to catch up with it.

Reverse launch

In case of reverse launch we recommend the trims to be set depending on wind speed (the stronger the wind, the more open position). Due to lack of overshooting tendency take-off is easy, pilot has only to brake slightly before turning.



Caution: During take-off it is important to keep the risers under pressure until almost airborne. Reflex profile used has an inherent tendency to increase the angle of attack. In effect, the paraglider can lag behind the pilot when not pulled up appropriately.

Flight

The enlarged speed range of the Cabrio may demand some attention. However, once you have mastered these additional aspects, flying will become pure pleasure. Good handling will let you make the best use of thermals, and increased speed on glides means that your presence in sinking air will be shorter.

When the trims are fully opened the wing becomes faster and stiffer, increasing its stability even more. The brake forces increase too, as well as the distance to the stall point. The radius and bank angle in turns grow proportionately to the growing brake forces. If the trims are set fast (or fully opened) and the wing is not flown

near the ground, a switch to TST handle is advised. Turns executed in this way will be slightly wider, but strength needed to initiate the turn will be smaller and there will be no decrease in speed. TST handles can be used at all trimmer settings.

Landing

With closed trimmers Cabrio lands like any other paraglider. The brake forces, initially low, are growing proportionally, giving ample warning before stalling. Still you should be careful when flying at low speeds until fully familiar with brake operation.

Landing with trims set fast may require proportionately more space, as the paraglider has a lot of kinetic energy and careless application of brakes may even cause the wing to climb.

Most pilots get to know the wing relatively fast and quickly gain enough trust to fly it in stronger conditions than they did ever before. Still, you should always be careful when flying low.

Winching

During tests, numerous flights were made with winch start and backpack power units, as these are the only means to gain some height in flatlands. Absolutely no reasons were found for not using Cabrio in such flights.



Caution: During launch, especially winched or with a paramotor, always remember to bring the wing directly over your head. The aerofoil and its angle of attack were arranged so as to give maximum lift coefficient with relatively high safety level. Therefore if the canopy is not pulled enough, it can stay behind the pilot, rendering launch difficult and/or dangerous.

In **powered flight** most of the wing characteristics remain as described before. Still there is additional information needed - concerning power output, proper matching of the wing/engine/propeller etc.

Dudek Paragliders cannot take responsibility for all possible combinations, but if you contact us in doubt, we are always ready to help.

First flights

In order to get familiar with your wing we recommend flying with trimmers set slow, because in this configuration Cabrio behaves as a classic paraglider. Flying like that try pulling the brakes some until you feel resistance, usually it will be at about 1/4 of the range.

Once you feel competent with your wing, you can start experimenting with faster trim settings and speed system. Learn to use all the additional speed and safety of the Cabrio.

! CAUTION: Before each start it is necessary to have a thorough check of the wing, harness and power unit (trike).

Classic foot launch

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

Preparing the canopy

Lay out the paraglider downwind of the power unit, with all suspension lines taut and pointing toward center of the power unit.

The risers are to be laid on the ground. Trimmers must be fully closed. In strong conditions faster settings can be advised. Make sure that you warm up the engine while standing windward of the wing. Stop the engine before clipping in the risers. Now run the pre-launch checklist (see page 14).

When you are sure everything is OK, you can clip the risers in the paramotor's harness.

Applying steady and equal pressure on both A risers move forward. The wing practically does not overshoot, so the front collapses that

otherwise happen quite often during launches are rarely seen with Cabrio. Instead it kind of waits for you to catch up.

From now on you should steer the paraglider facing forward, without looking back over your shoulders. When the canopy lies low behind you and you will try to turn, some lines can get in the propeller. On the other hand, possible fall on your back and damaging the propeller is dangerous (and costly!) so it should be avoided at any price, even that of some damaged lines!

During take-off, when you feel that the strain on both risers to be equal, open up full power and lean back to counter the engine thrust, so that it can push you forward rather than towards the ground. The best option is not to use the brakes, allowing the paraglider to rise as it was laid out. If it starts to swerve from its course, just pull the opposite riser and run under

the centre of the wing while observing starting direction. If the wind lulls, give a stronger pull on the risers.

If the paraglider drops to one side or back too far to rise again, kill the engine, interrupt launch and assess the conditions once again.

As the wing rises, the forces grow lighter and it should stabilise above your head without overshooting. This is the best moment to

check if it is inflated in full and the lines are not tangled, but do so neither stopping nor looking back over your shoulder. Once you feel the forces on the risers decrease, run faster and let go of the risers. See if there is already any opposition on the brakes and, if necessary, use them to correct direction or to increase lift at take-off.

Remember:

- If the cage of your power unit is not stiff enough, the risers strained during launch can deform it to the extent of colliding with the propeller. Before giving it full power, see that the cage did not catch any lines.
- Any brake operation (or steering inputs in general) should be smooth and gentle.
- Do not try to take off until you have your wing overhead. Hitting the gas pedal before that can cause dangerous oscillations.
- Do not sit in the harness until you are sure you are flying!
- The faster the trim setting is, the more brake input is required to take off.
- The lower the hangpoints of your power unit are, the easier is the launch.

Forward launch with trike

Basic difference of the trike launch is that you are using your power unit to get the wing overhead, and instead of pushing the A risers usually a launch assist system is used.

After all preparations and checks, with the risers properly clipped in you can start the engine. If a launch assist system is used, there is just a steering handle in one hand, with the other hand grabbing the other brake handle and throttle. Depending on power output of your motor initially open the throttle only enough to fill up the canopy and get it above the propeller downwash.

When the trailing edge gets some three meters above ground and both risers are equally loaded, open the throttle fully. Preferably you should not be using the brakes during launch at all and let the canopy rise as it was laid out. If you see it getting off course, give a delicate counter brake and steer your trike under canopy root (center), while maintaining general take-off direction steady as possible. If the wing drops too far to the side or behind you to get it up again, switch off the engine, abort launch and re-evaluate conditions.

As the canopy rises, its resistance grows lighter and it should stabilise above your head without overshooting. Too hasty

corrections of launch direction can result in sidewise oscillations – still, if they are not too deep, you can keep full power in order to get off the ground as soon as possible.

After lift-off canopy will stabilize itself overhead and throttle can be eased off a bit to get desired climb speed.

Reverse launch in strong wind

Reverse launch can be executed only as a foot launch or with ultralight single-seated trike. You can do it holding both A risers and one brake in one hand, with throttle and the second brake in the other hand. With a decent wind it is by far the best way. In weaker wind it is better to choose a forward launch, as running backwards with an engine on your back is not an easy thing to do. It is reasonable not to pull the wing up until you are really determined to launch, especially when it is clipped in.

Lay down the rolled paraglider with the trailing edge facing the wind. Unfold the wing enough to find the risers and check that no lines are looped over the leading edge. Stretch the risers against the wind, separating the left and right one.

We suggest that you lay the risers in the same way as you will be turning during a reverse launch, and place one riser over the other,

with the rear risers upmost. It should be done this way because once you clip in, the cage of your power unit will make turning on your own impossible.

Now run the pre-launch checklist.

After warming up the engine put the power unit on, turn to face the wing, go to the risers and clip them in the appropriate carabiners. Pulling on the front and rear risers open the cells. It is a good idea to pull up the wing briefly in order to check that the lines are not tangled. Holding the risers, brakes and throttle as described above, pull the front risers and raise the paraglider over your head. On most occasions you will

not have to brake it, especially if the trimmers are set for fast flight. Perhaps it does not agree with your experience, but this is the way the reflex profile works. When the trimmers are opened (set above "0"), the reflex profile stabilises the wing and does not allow it to surge forward. It can even stay back a little - in such case pull the brakes a little and the glider will come forward.

Once you have it overhead, turn around, open the throttle and take off. As with the classic launch, in this case too you have to find such combination of trimmers, brakes and throttle settings that will give you the best speed and rate of climb.

Climbing

Once you took off safely, continue heading against the wind, using brakes to correct rate of climb.

Do not try to climb too steeply - attempts to increase climb rate by pulling the brakes will have an adverse effect, as due to additional drag the actual rate of climb will worsen and with the throttle fully opened even a stall can occur.

In powered flight the Cabrio behaves more like an aeroplane than a paraglider, and it is good idea to regard it as such. If there are no obstacles present, it is by far safer (and more impressive for the spectators) to level for a while after take-off and gain some speed before converting it to height with a brief pull on the brakes.

Another reason not to try climbing too steeply is the risk connected with engine failure at low altitude. Even as the Cabrio in a steep climb does not stay behind as much as conventional paragliders do, the low speed is more likely to cause a stall. Besides, you should always be able to land safely in case of engine malfunction, so it's better not to take unnecessary chances and always fly with a safe margin of speed.

Depending on the power unit geometry, it is possible that after

take-off you will notice a propeller torque (turning moment). It will try to turn you around, so counteract with a brake.

The risers of the Cabrio feature our TEA system (see next page). Pulling the knot down through the tube are the way to counter the torque effect when your paramotor is not equipped with cross-bracing. For the TEA system to work properly you have to make and adjust the stopping knot accordingly to the amount of torque.

When climbing steeply with slow trim settings and high power output keep in mind the risk of stalling!

Due to typical PPG and PP&GG feature - considerable vertical distance between thrust axis and wing chord - the range of safe power operation is closely connected to your skills and equipment.

Power-unit induced oscillations

Certain configurations of engine weight, output, propeller diameter and height & width of hang points can cause serious oscillations, during which the pilot is lifted to one side by the torque effect, swings down due to his weight, then is lifted again and so on.

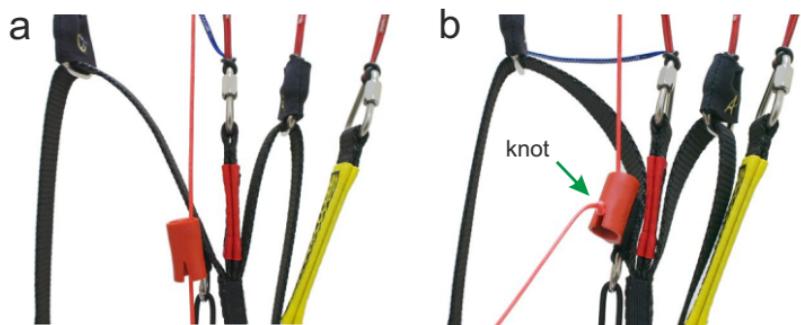
To avoid this you can:

- change the throttle setting and/or
- use the TEA, pulling down the knot through the tube, simultaneously blocking it in the slit and/or
- shift yourself to the other side of the harness and/or
- change the trimmer setting.

Such oscillations usually occur at full power - the greater the engine output and propeller diameter, the bigger the swings. In addition there are often too late or wrong pilot reactions, increasing the trouble instead of solving it. In any case the safest way to deal with this question is to reduce throttle and release the brakes.

Especially less-experienced pilots tend to overreact. It is called a pilot-induced oscillation, and proven solution in this case is to leave brakes alone.

TEA line non active (a) and active (b).



The effect of turning the paraglider away from the propeller turn direction can be neutralised by the TEA. The TEA knot can be put precisely where needed to completely stop the torque, and can be used in flight when needed.

Level flight

Once you have gained safe height after take-off and wish to go for a route, you can turn on the right direction, fully open the trimmers and let off the brakes. If the conditions are turbulent, it can look foolhardy, but this is the essential feature of the reflex profile - the faster you fly, the safer your Cabrio. That's why it's actually possible to release the brakes and enjoy your flight.

! **Caution:** Some pilots with previous free-flying paragliders experience may have a well-grounded habit of keeping the brakes slightly taut at all times. Such a technique, while quite reasonable on a free-flying wings as it allows for quick pilot reactions and decreases sink, is not advisable for reflex paragliders. When you pull the brakes, the Cabrio profile loses its reflex characteristics.

If you happen to have a variometer or altimeter aboard – watch it. In a level flight it is very easy to start climbing unintentionally. The instruments will help you optimise speed and fuel economy.

Good knowledge of weather conditions (e.g. wind at different altitudes) and smart use of thermals, convergence and other kinds of lift is another way of greatly reducing fuel consumption and increasing your flight range.

Trimmers operation

The reflex wing section enables the Cabrio pilot to use a wide range of trimmers. You are free to experiment with all possible settings, as long as you are on safe altitude.

Fully opened trimmers increase the speed and stability of the wing, and with it also its ability to cope with turbulences and overall penetration. As forces on the brakes grow at high speeds, steering with TST handles becomes increasingly effective.

At fully opened trims we strongly recommend steering with TST handles (especially in rough air!) - using main handles can lead to side collapses. Turns executed in this way are slightly wider, but needed steering force will be smaller and airspeed will not decrease.

Study drawings showing trimmer operation as well as their influence on the canopy shape.

With slow trimmer settings there is an improvement in sink rate and steering forces diminish, so exploring the thermals becomes possible.

Turns can be much tightened and more effective with differential brake operation. Slight use of the outer brake (with considerable

amount of the inner one) will diminish the loss of lift during turn. Turns can be much improved by additional use of throttle as well.

Once with growing experience you will master different techniques, you will be able to execute fully coordinated and effective turns, that will bring to mind the aeroplane handling.



REMEMBER:

Trimmer setting is another part of the pre-start check list!

If it will be asymmetric, the wing will be turning all the time. And if you will inadvertently set them off, the reflex profile of the Cabrio will keep the wing level, so after opening the throttle you'll start to descend with increased speed instead of climbing.



NOTE: Trimmers of the Cabrio do not have a printed scale - we do not think it is necessary. However, if you would like to mark your favorite settings, there is a silver, oil based marker pen included in the set. With it you can draw a line anywhere or mark the tapes as you like (position for take-off, cruising, etc.)



brakes influence on the reflex airfoil

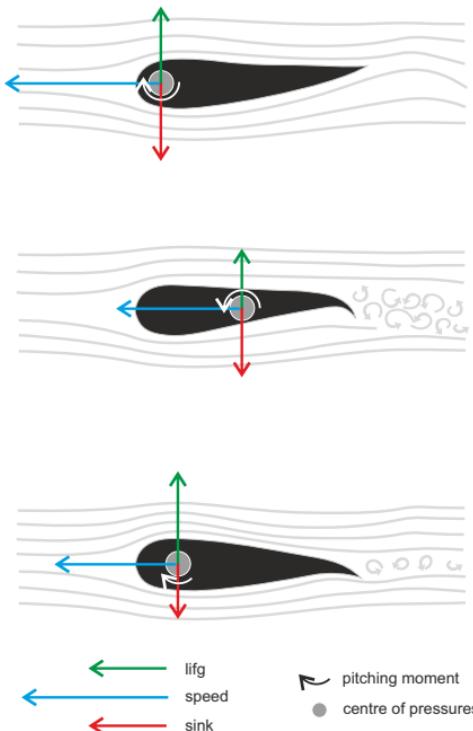
Influence of brake operation on the reflex profile

Pilots used to flying classic paragliders tend to „active” piloting with their brakes always under tension. Flying a reflex wing like that is not only ineffective, but can be dangerous too.

The basic rule of flying reflex paragliders says: the more turbulent is the air encountered, the more trims should be released and use of regular brakes avoided.

Steering the paraglider in such configuration is most effectively done with TST handle or TEA line, designed specifically with that use in mind.

Problem is demonstrated with following drawings.



Released trimmers without using brakes

Typical configuration for fast and safe flying. Center of pressures of the aerofoil moves forward, practically excluding frontal collapses. Pitching moment increases the attack angle.

Released trimmers with brakes applied

Even slight brake operation will move the centre of pressures backwards, and the pitching moment will decrease the angle of attack. Additionally, the airflow is considerably disturbed. In particular cases this can cause a collapse. Steering can be necessary for heading corrections, nevertheless you should keep your brakes fully released when flying straight – otherwise the reflex feature will not work.

Closed trimmers

Using the brakes is a typical steering mode in this configuration and does not cause any danger. This setting is used during launch, landing and thermalling. The canopy behaves much as classic profile paraglider, with slightly increased tuck resistance.

Trimmers Closed

Slowest speed, minimum sink



A - 420

A' - 420

B - 420

C - 420

D - 420

Trimmers fully released

Maximum speed and increased sink



A - 420

A' - 420

B - 420

C - 500

D - 580

* lengths of the risers incl. maillons, length tolerance +/- 5mm



In paramotor flying there are two kinds of landing: with and without power.

Power off landing

At an altitude of 50 metres switch the engine off and start gliding down as on a conventional paraglider. It reduces the chances of damaging the propeller on landing, but on the other hand there is only one attempt possible - so it has to be done right!

With or without power Cabrio better copes with turbulence on faster trimmer settings. So, if the conditions are rough, it is better to make an approach with greater speed, plan a lot of space (as for a hangglider) and wear that speed off before touching down. Cabrio preserves the energy well, so there is a long float necessary to exchange the abundant speed for lift.

If the landing field is not big enough and you have to land on the spot, we advise you to close the trimmers. It will increase lift coefficient of the wing, simultaneously decreasing its sink rate and speed.

Such an action is especially important when flying with high surface loading.

Landing with power on

Make a flat approach with the engine idling, then level out and lose

the speed before final flare. Immediately after touchdown switch off the engine.

The main advantage of this procedure is of course the possibility of a repeated approach in case of misjudgement. Still, if you forget to switch off the ignition before the wing falls down, there is a considerable risk of damaging propeller, catching lines in it or even suffering injuries connected with tripping over on your running engine.

REMEMBER:

- Whenever possible, get to know the landing field before taking off.
- Check the wind direction before planning the approach.
- Landing with power off requires much less space.
- In case of any doubt, practice the landing until you feel totally safe.

Golden rules!

- Never place the power unit downwind of the paraglider.
- Check, double check and then check once again if there is no fuel leakage.
- Do you have enough fuel for the flight? It's always better to take too much than too little!
- Check if there is nothing loose in the harness, that could possibly contact the propeller in flight.
- Whenever you encounter a problem, fix it AT ONCE however small it is!
- Always put on and lock the helmet before getting in the harness.
- Before each launch run a full pre-flight inspection.
- After landing, control the wing facing the direction of flight, since turning you always risk getting lines in the propeller. Turn only if there is danger of falling on your back.
- Do not ask for trouble - do not fly over water, between trees or power lines etc., where engine failure will leave you helpless.
- Mind the turbulence caused by other gliders or even by yourself, especially when flying low.

- It is not reasonable to let go of the brakes below 100 meters, because a possible power unit malfunction may require immediate attention.
- In general never trust your engine, as it can stop at any moment. Always fly as if it's exactly what it's going to do.
- Unless it is absolutely necessary (e.g. collision avoidance), do not execute tight turns against the torque direction. Especially when climbing you can easily enter a stall and consequent negative spin.
- Do not fly with tail wind at low altitudes, as it pretty much narrows your options !
- Do not wait for the problem to grow - any change of engine sound or a vibration can indicate troubles. Land and check it out!
- Be certain of your navigation.
- Remember that not everyone is fond of your engine noise.
- Do not scare the animals.

Quick descent methods

Big Ears

In order to get the big ears you have to pull down the outer lines of the A' risers (usually distinguished with neoprene) by about 20-50 cm.

While inducing big ears you should never let the brakes out of your hands.

After tucking the tips in, Cabrio will continue to fly straight with increased sink rate (up to 5 m/s). You can steer the wing pretty efficiently with weight-shifting.

After releasing the lines, the paraglider will usually open up on its own or you can assist it with a long stroke of the brakes.

For the sake of safety (the possibility of a parachutal stall) it is reasonable to engage speed system after pulling big ears in order to lessen the angle of attack of the wing centre. Executing big ears with open trimmers is very difficult due to the reflex profile stabilisation.

CAUTION! Never try to pull big ears during powered climb, as the increased drag can lead to increase of the angle of attack and a parachutal stall.

Besides, pulling the ears while climbing is pointless anyway.

B-stall

B-stall can be executed only with fully closed trimmers.

To enter a B-stall you have to simultaneously pull both B-risers (yellow) down by 10 - 20 cm. The wing collapses on its entire span along B-row, the airflow over the top surface will break and the canopy projected surface will be significantly reduced. Forward speed will die and you will be descending almost vertically.

Further pulling of the B-risers is not advised, as the wing instability can grow.

This manoeuvre is rather hard to execute on the Cabrio due to great forces required to pull in the B riser.

To exit a B-stall, the risers should be released in a smooth and decisive manner.

On quick and symmetrical releasing B-lines the airflow will be reinstated and the wing will surge forward, returning to normal flight. If the canopy forms a horseshoe with the wingtips in front of you, gently apply both brakes to recover.

Spiral dive

A spiral is characterised by reaching the highest sink rates possible.

Significant G-forces, however, make it difficult to sustain a spiral dive for a long time, as it can place high loads on both pilot and glider, to degree of losing consciousness by the pilot. Never do this manoeuvre in turbulence or at too high bank angles.

Control the dive and do not exceed 16 m/s sink. If the dive is not stopping after releasing the brake, assist the glider with the outer one.

! **Caution:** Never execute manoeuvres generating high G-forces (spiral dive, dynamic wingovers etc.) on released trimmers, as this is very dangerous!

Releasing the trimmers shifts the loading centre of the canopy forward, toward leading edge. This rule affects all paragliders, but the more reflex is present in the airfoil, the more aggressive is that effect.

A typical reflex paraglider on released trimmers shows following load

distribution according to line rows: A=60%, B=30%, C=5%, D=5%. Taking over as much of the load by the A and B rows of the reflex canopies (90% in total) brings about their praised stability. However, in connection with a dynamic manoeuvre which a spiral dive is, it can shift the load dangerously close to its maximum value. Similar situation occurs when executing spirals or wingovers with big ears pulled. That's another example of concentrating whole load on reduced wing area, which - combined with high G manoeuvres - shifts the peak loads unnecessarily close to their maximum values.

Wing over

You make a wingover by performing a series of consecutive, alternating turns with increasing bank angle. Too aggressive banking with unsufficient control can result with a massive collapse.

Aerobatics

Cabrio was not designed to do any aerobatics.

! **Caution:** All rapid descent techniques should be practiced in smooth air and only with sufficient altitude margin! Full stalls and spins are to be avoided as they are not recommended techniques of clearing dangerous situations.

Irrespective of paraglider type they may lead to dangerous consequences!

! BY FAR THE BEST TECHNIQUE IS SAFE AND CORRECT FLYING, SO THAT YOU WILL NEVER NEED TO DESCEND RAPIDLY!

Extreme manoeuvres

! EXTREME FLYING MANOEUVRES SHOULD ONLY BE CARRIED OUT DURING SAFETY TRAINING COURSES (INSTABILITY TRAINING) UNDER PROPER GUIDANCE!

One sided collapse

Can happen in strong turbulence.

With collapses up to 50% pilot has a couple of seconds to react before the wing will enter rotation. Standard counter-steering is enough to keep the paraglider on course.

Under normal conditions the canopy will reinflate instantly and spontaneously..

Frontal collapse

The reflex profile of the Cabrio makes it practically impossible, especially at higher speeds. During tests we succeeded in creating this situation only with fully closed trimmers and using special measures. Such forced collapses can lead to extremely deep collapses, so recovery will require decisive pilot action (short and equal application of both brakes).

Full stall and negative spin

Practically do not occur, may happen only as a result of serious neglect or intentional action of the pilot. You have to be careful when flying at very low speeds until fully familiar with brake operation.

The canopy recovers spontaneously in initial phase of stall, otherwise use standard procedures.

Deep stall

Under normal conditions does not occur. If you want to prevent it at all, simply stick to a couple of rules:

- after B-stall, release the risers quickly and evenly. Don't be afraid – the canopy does not jump forward excessively.

- before big ears execution, release the trimms by few cm. This will increase both the sink rate and safety margin, as big ears constitute an effective aerodynamic brake with significant loss of speed.

Nevertheless, if such a parachutal stall happens e.g due to strong turbulence, simply release the trimmers or push the A risers forward.

Line over and cravatte

It is a modern wing which, in order to decrease drag has fewer suspension lines with greater distances between them, as well as stiff leading edge.

That's why it's always possible that after a tuck one of the stabilisers may tangle in the lines. Usually a couple of pulls with a brake settles the matter. If it's not enough, try to untangle it with big ears or a stronger pull on the risers.

In case of any doubts you should seriously consider throwing the rescue chute.

Emergency steering

In case of any malfunction rendering normal steering impossible, you can safely steer and land the paraglider using the D-risers (blue marking) or stabilo lines. Directional steering can be executed by TST handles too.

Special procedures and other configurations

Flying on Cabrio does not require knowledge of different procedures and configurations than those described in this manual.

Cleaning and storage

The Cabrio design incorporates newest technologies, including stiffening rods in the leading edge. That's why the canopy should be folded carefully, accordingly to its design, so that good conditions for transport and storage are observed.

Basic rules to be followed when folding the canopy:

- Fold it accordion-wise rib to rib (cell by cell). Do not fold it by halves, placing the stabilizers at the centerline.
- When a compact package is created on the longest chord do not roll it, but fold three to four times (depending on the chord length) from trailing edge towards the leading one.
- The leading edge remains on top of folded canopy.
- Never pack your paraglider too tightly.
- Optionally pack the wing into a dedicated WingShell.

If you have completely prepared your gear but have to wait for launch, a good idea is to use a quickpack, to protect your wing against moisture and UV rays. Never pack or store the glider when wet, as it significantly shortens life of the fabric. Remember that

wing gets wet even when laying on a green grass in full sun, as the grass transpires.



Caution: Locking a wet paraglider in a car exposed to sun is absolutely unacceptable! Hot car interior acts like an oven and as tests have shown that color bleeding/transfer can happen even at 50 Celsius grade. The warranty does not cover such damages!

While drying, never expose your paraglider to direct sunlight operation. Store the paraglider in a dry place, away from chemicals and UV exposure. Ideal storage temperature for the paragliders is 5 to 25 Celsius.

Cleaning

Clean the paraglider with water and a soft sponge. Do not use any chemicals or alcohol, as these can permanently damage the fabric.

Deterioration - a few tips

The paraglider is made mainly of Nylon - a fabric which, like any other synthetic material, deteriorates through excessive exposure to UV rays that come with the sunlight.

Hence it is recommended to reduce UV exposure to a minimum by

keeping the paraglider packed away when not in use. Even when packed in a bag, it should not remain in the sun for long.

Suspension lines in this paraglider consist of Technora inner core and polyester sheath. Submitting them to excessive bending and loading in flight should be avoided, as it can cause irreversible damage.

Please note that with frequent kiting on a field or a small hill your paraglider will deteriorate more quickly due to its repeated rising, falling and being dragged around.

Uncontrolled strong wind takeoffs or landings can result in the leading edge of the canopy hitting the ground hard, which may seriously damage the ribs, sewing and surface cloth (including coating damage).

Keep the paraglider clean, since getting dust in the lines and fabric will reduce their durability.

Be careful to keep snow, sand or stones from entering the cell openings: their weight can slow or even stall the glider, while sharp edges can damage the cloth.

Prevent lines from catching anything, as they can overstretch or tear. Never step on the lines.

Knots can chafe suspension and/or brake lines.

Check the length of your lines after tree or water landing, as they can stretch or shrink. The lines can be measured at the manufacturer or an authorised workshop.

After landing in water you should check the wing fabric as well, since waves can cause the fabric to distort in some areas.

When taking the wing out of the water, always do this by trailing edge. After a sea landing, rinse the paraglider with fresh water.

Since salt crystals can weaken the suspension lines even after rinsing in fresh water, you should replace the lines with new ones immediately after contact with salt water.

Frequent flying near oceans and seas accelerates deterioration of the paraglider, as salt present in the sea breeze can make the lines stiffen and even break.

Repairs

Repairs should only be carried out by the manufacturer, authorised distributor or an authorised workshop.

It is acceptable to fix minor cloth damage with self-adhesive patches included in the package.

Inspections

Full Inspection is recommended **every 24 months or every 150 hours** whatever comes first, if not advised otherwise by the inspecting person due to paraglider's condition.

In case of paragliders used **commercially** (e.g. in schools or tandem flying) a Full Inspection is recommended **every 12 months after first 24 months from purchase date or every 100 hours airtime** (whatever comes first).

A paraglider can be officially inspected only by the manufacturer or a dealer (authorised to do so).

We are aware that purchase of a new paraglider is a big expense for every pilot. That's why we guarantee quality of our products, as well as optionally we are offering a security system that will allow you to insure your paraglider against possible damage and repair costs with an AeroCasco insurance.

Warranty:

Dudek Paragliders guarantees free of charge repairs in case of damages caused by the material or production flaws:

36**36 Months Warranty****24****24 Months Warranty****18****18 Months Warranty**

For the free-flying paragliders warranty covers 36 months (3 years) or 300 flight hours, whatever comes first. If the free-flying paraglider is used for

powered flights, every hour flown is counted double (not concerning PPG paragliders).

For the paramotor canopies (PPG) warranty covers 24 months (2 years) or 200 flight hours (whatever comes first).

For the light wings, for speedriding, speedflyng, schools or professional users warranty covers 18 months (1,5 year) or 150 flight hours (whatever comes first).

Warranty does not cover any of the following:

- canopy colour fading as well as bleeding caused by improper storage/transport
- damage caused by chemicals or salt water
- damage caused by improper use
- damage caused in emergency situations
- damage resulting from accidents (airborne or otherwise)

Warranty is only valid if:

- flight hours can be identified basing on properly kept logbook of the owner (and his possible predecessors) with marked PPG hours.
- the paraglider is used in accordance with the operating manual
- the owner did not make any repairs by him/herself (excl. minor repairs with self-adhesive patches)
- the owner did not make any modifications
- the paraglider can be unmistakably identified by data sheet/sticker
- the paraglider has been properly inspected at all times.



Note: In case of damages caused by the material or production flaws please contact the dealer that sold you the gear. The dealer will determine further actions.

If you have bought the paraglider second-hand, ask previous owner for a copy of his logbook (covering entire use of the paraglider from the day of original purchase).

AeroCasco

Standard warranty does not cover repair costs of damages caused by the user or a third party. Since costs of such repairs can be considerable, Dudek Paragliding offers an AeroCasco insurance. It offers a one time repair of any mechanical damage, no matter how big and who caused them.

The only expenses you will be facing are shipping costs and the share-of-cost amount. AeroCasco can be purchased for a brand new paragliders only (at the purchase). The AeroCasco costs 50 €.



Note: AeroCasco is not available for all paragliders (check before purchase). It can be purchased only for privately used paragliders.



AeroCasco covers only damages occurring while taking-off, flying or landing. Obviously, all faults in the material and manufacturing flaws are covered by normal warranty.

When handing the paraglider for the repair you have to present a card confirming its AeroCasco status. After the repair you will have to cover only the share-of-cost value of 50 euro. AeroCasco is valid for one repair only during covered time.

There is a possibility of extending AeroCasco for one further year.

To do this you have to send your paraglider for inspection to the manufacturer not later than a year after the date of purchase. The AeroCasco extension fee is 75 EUR (including inspection). Remember to include the AeroCasco confirmation when you send the paraglider for inspection.

AeroCasco does not cover any of the following: theft, canopy discolouration, damages caused by incorrect storage damage or transport, damages caused by chemicals, salt water or force majeure.

Environmental care

Paragliding is an outdoor sport.

We believe that our clients share our environmental awareness.

Exercising paragliding you can easily contribute to environment preservation by following some simple rules. Make sure you are not harming nature in places where we can fly. Keep to marked paths, do not make excessive noise, do not leave any garbage and respect fragile balance of the nature.

Recycling of used gear

A paraglider is made out of synthetic materials, which need to be properly disposed of when worn out.

If you are not able to dispose of the paraglider properly, DUDEK Paragliders will do that for you. Just send your paraglider to the address given at the end of the manual, accompanied by a short note.

The Dudek paraglider you bought should include following items:

- a backpack or MotoBag (optionally)
- transport bag (with your canopy inside)
- the paraglider itself (canopy, lines and risers)
- compression strap to keep the canopy together
- wingshell (optionally)
- wind indicator (windsock or a strap)
- pocket with paper work and repair wallet including:
 - piece of self-adhesive fabric (10 cm x 37.5 cm) for small repairs. Note that even small tears located in the vicinity of stitches are to be repaired by an authorised service only.
 - looped and stitched suspension line (the longest of all lines in the paraglider) to be used as a temporary replacement. Do not cut it if you have to temporarily replace a shorter one, just tie it at the length needed.
 - paraglider passport with entered date of purchase and valid technical inspection (please check the serial number

with the sticker on wing tip).

- USB drive with this manual
- oil based marker pen for individual markings on the trimmer strap.
- small gifts



technical data

Cabrio	30	34	38	42
Approval - ULM identification	-	-	-	-
Number of cells	53	53	53	53
Surface area (flat) [m ²]	30,00	34,00	38,00	42,00
Surface area (projected) [m ²]	25,51	28,91	32,44	35,71
Span (flat) [m]	12,73	13,55	14,32	15,06
Span (projected) [m]	10,12	10,78	11,39	11,98
Aspect Ratio (flat)		5,40		
Aspect Ratio (projected)		4,00		
Sink rate [m/s]		min = 1,6 + - 0,2		
Speed [km/h]		min = 32; trim = 46; max = 59 + - 5		
Max. cord [mm]	2906,00	3093,00	3270,00	3438,00
Min. cord [mm]	740,00	787,00	832,00	875,00
Distance pilot to wing [m]	7,64	8,13	8,59	9,04
Total line lenght [m]	410,48	437,86	463,67	488,16
Total take-off weight [kg]	110 – 300	130 – 350	160 - 400	210 - 475
Distance between risers [cm]	60,00	60,00	60,00	60,00
Weight [kg]	6,45	7,07	7,57	8,17

Fabric	Porcher Sport 38 g/m ²
	Dominico tex 34 g/m ²
	Porcher Sport Hard 40 g/m ²
	SR Scrim, SR Laminate 180 g/m ²
Risers	PASAMON - Bydgoszcz, Poland

* Detailed list of materials used for the manufacture can be found in service documents file on the page of a wing,
available on our website www.dudek.eu.

The rigging scheme itself is published on the next page, while tables of line lengths you will find in attachments to this manual.

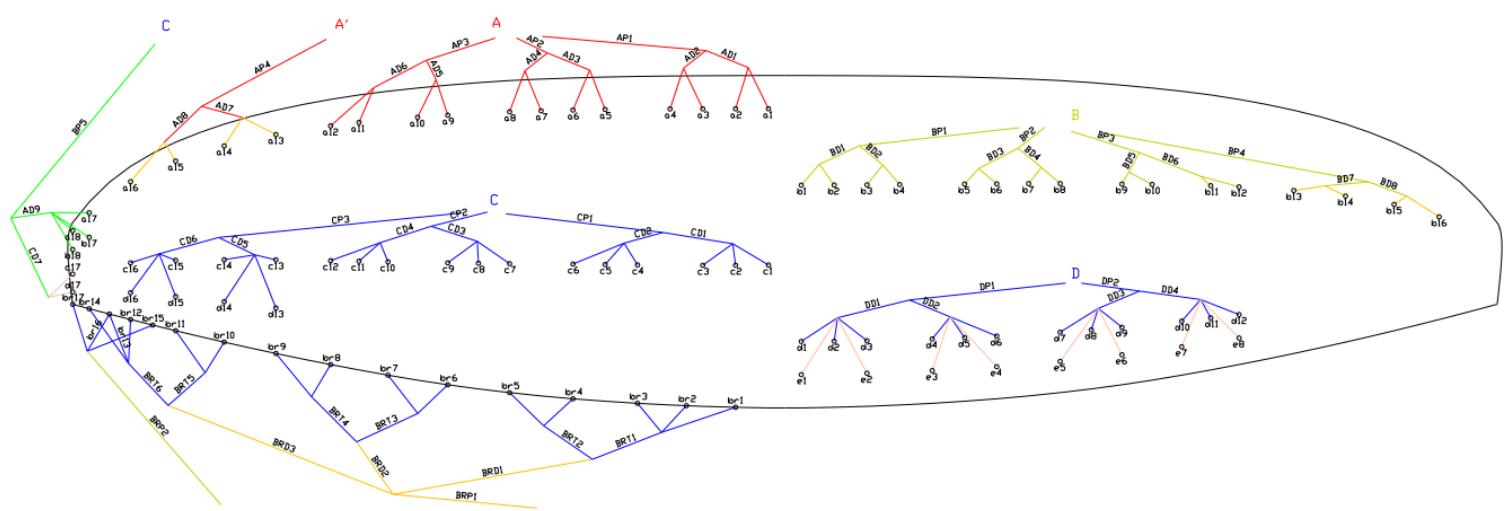
Lengths are measured with a specialised, computer-operated device. All the lines before measurement are stretched with a steady 5 kg load. Thanks to abovementioned device and proper procedures, final tolerance of line lengths does not exceed +/- 10mm.



Note: Distances given below are to be understood as distances between connection points. When cutting a line for repair, **20 cm extra must be added**, as at each end a 10 cm stitch is required to fix the loop. The only exception is the main steering line (BRP), which is looped only at the upper end, with at least 150 mm margin for fastening brake handle (this means for this line extra 25 cm than in the table is needed).



Note: accordance of all suspension and steering lines as well as risers with dimensions given in this manual has been confirmed by testing center after completing the test flights.



If you respect the rules of safe flying and proper glider care, you will enjoy many years of pleasant airtime on your wing. Still, you must be aware of possible dangers and face them wisely. You must accept the fact that all air sports are potentially dangerous and your actual safety depends solely on you. We insist that you fly safely, and this concerns both the weather choicesafety margin during all manoeuvres.



Caution: FLYING THE PARAGLIDER IS ALWAYS YOUR OWN RESPONSIBILITY!

SEE YOU IN THE AIR!



F L Y



L A T A M



Ν Ν Ν Ν Ν ™



V O L E R



V O A R



F L I E G E



Л Е Т А Ў

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