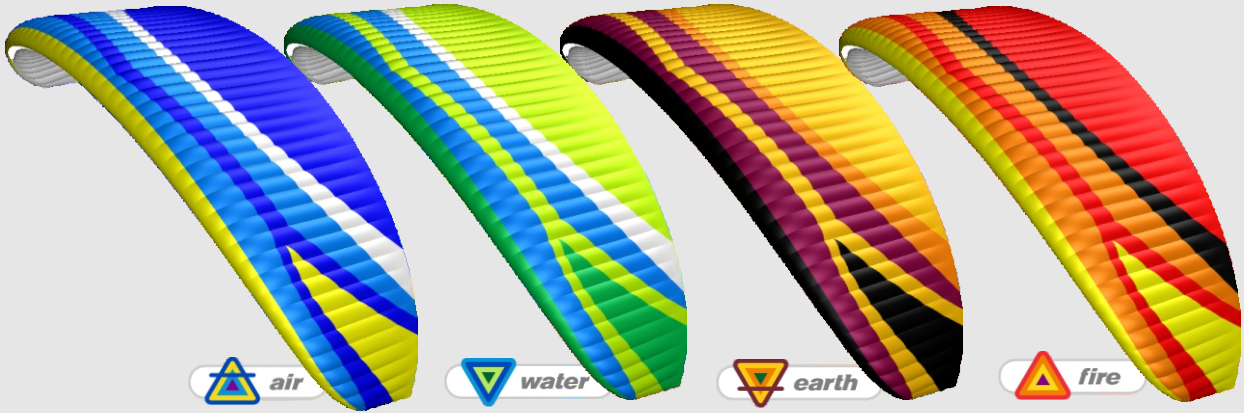
V 05.03.2018

Universal 1.1



DUDEK paragliders

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 among paramotor canopies.

Extensive 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 cannot affect the basic design parameters: technical data, flight characteristics or strength. In case of any doubts contact us please.

For whom the Universal 1.1?

Universal is the first free flying (EN B) paraglider ever which can be converted by its user into a full-blood paramotor canopy (conforming to the DGAC standard).

Universal us the first paraglider ever to smoothly and efficiently merge two aspects:

- nicely hadling free-flying paraglider (with EN/B certificate),

- full-blood paramotor canopy (conforming to DGAC standard).

Universal is dedicated for beginner and recreational pilots who fly:

- exclusively free (but want to benefit from moderate reflex ability)

- mostly free, sometimes with paramotor

- both free and paramotor

- mostly with paramotor, sometimes free

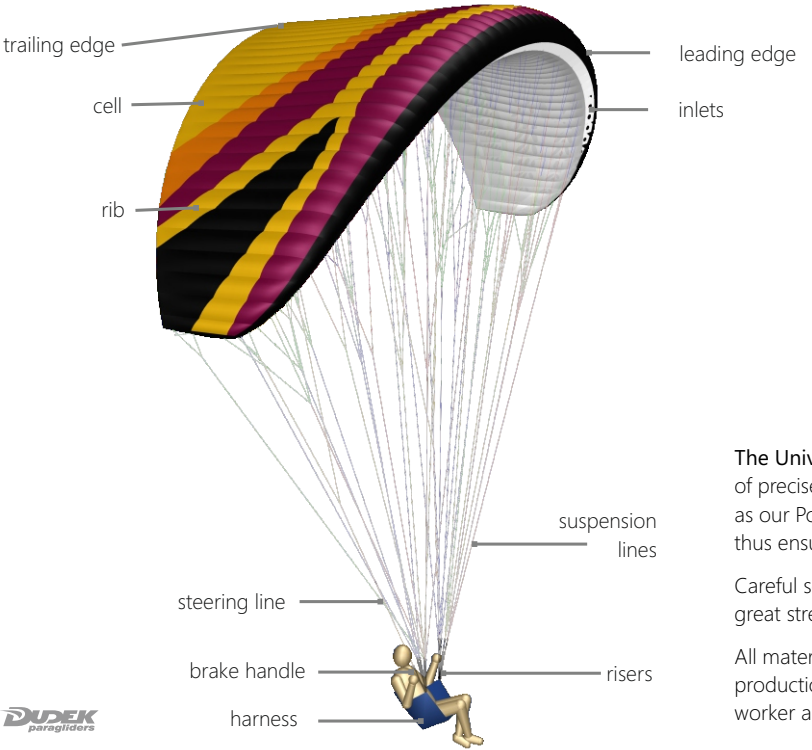
- exclusively paramotor (but appreciate better economy, easier launch and nicer handling than in standard paramotor wing.

Universal is a great free-flying recreational paraglide. Beginning pilots will surely appreciate exceptional comfort in uneasy thermals, resulting from considerable amount of reflex traits present in the design.

On activating the trimmers and setting up the ALC+ steering, Universal 1.1 becomes a full reflex paramotor wing, good for both leisure and cruise flying, thermalling, last but not least for initial paramotor training.

Universal 1.1 is refreshed version of its predecessor with upgraded risers and new colour design in four elements schemes. Dominico cloth is replaced by Porcher, colours of the lines are changed too (according to PMA standards). We have modernized risers equipment, make it more simple and comfortable. Basic parametres of the wing are the same.

As is the case of all our paragliders, the design draws on our long-time experience, simultaneously incorporating state-of-the-art technologies. The Universal is certified EN-B and LTF-B, and is in last stages of receiving paramotor (DGAC) certificates.



DOA
Dudek Optimized Airfoil

CSG
Canopy Shape Guard

LR
Laser Technology

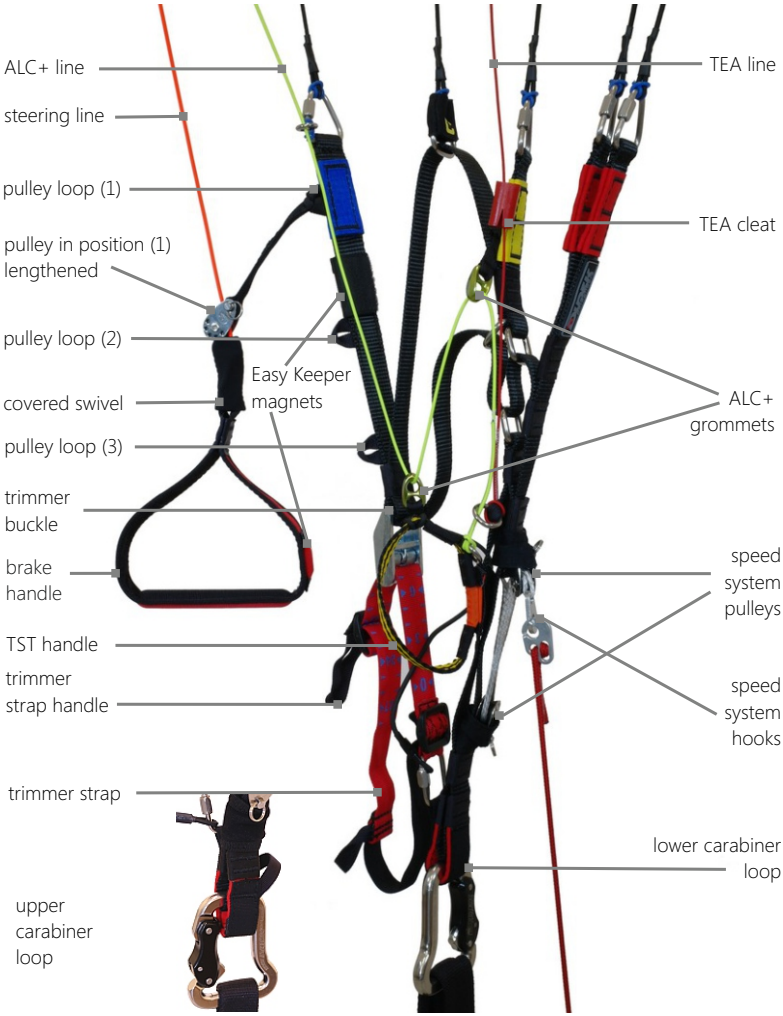
FET
FlexiEdge Technology

ACS
Auto Cleaning Slots

The Universal 1.1 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.


ALC+ line
steering line
pulley loop (1)
pulley in position (1) lengthened
pulley loop (2)
covered swivel
pulley loop (3)
trimmer buckle
brake handle
TST handle
trimmer strap handle
trimmer strap
upper carabiner loop
Easy Keeper magnets
TEA line
TEA cleat
ALC+ grommets
speed system pulleys
speed system hooks
lower carabiner loop

For the Universal 1.1 we have chosen four-way risers equipped with:

- ELR (Easy Launch Riser) system. It is a specially marked A riser (with red cover);

ELR
Easy Launch Riser

- speed-system affecting A, B and C risers when engaged, featuring ball-beared pulleys and a dedicated line;
- trimmers of red band marked with appropriate scale, designed for easy and fast replacement in case of deterioration;

TR
Trimmers

- three levels of the pulleys, to be used depending on the hangpoint level;
- ALC+ offers effective turning even at full speed, without excessive changes in the profile (i.e. its stability). The steering part here is the separate yellow line, fixed to proper steering lines which run to the trailing edge.

ALC+
Alternative Steering System

- TST - (Tip Steering Toggle) - additional mini steering handles fixed to the ALC+ lines.

TST
Tip Steering Toggles

- TEA (Torque Effect Adjuster) - eliminates the engine torque effect, shifting paraglider contrary to propeller turn direction. The TEA system is adjustable.

TEA
Torque Effect Adjuster

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

Other systems

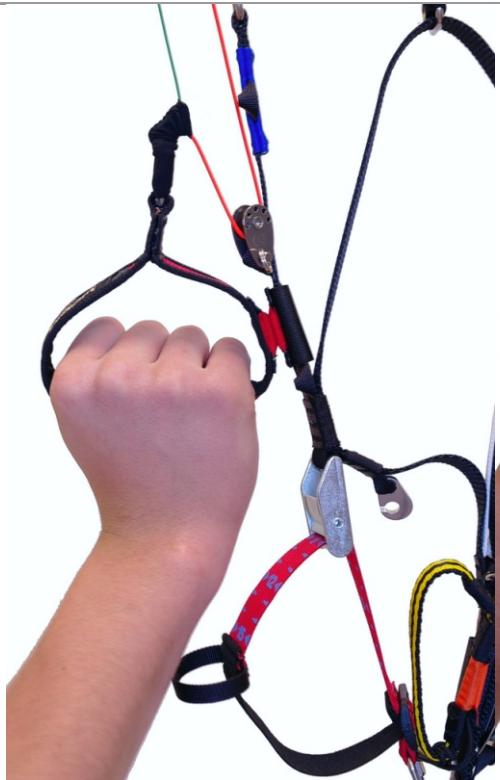
This paraglider has no other systems which can be adjusted, exchanged or removed.

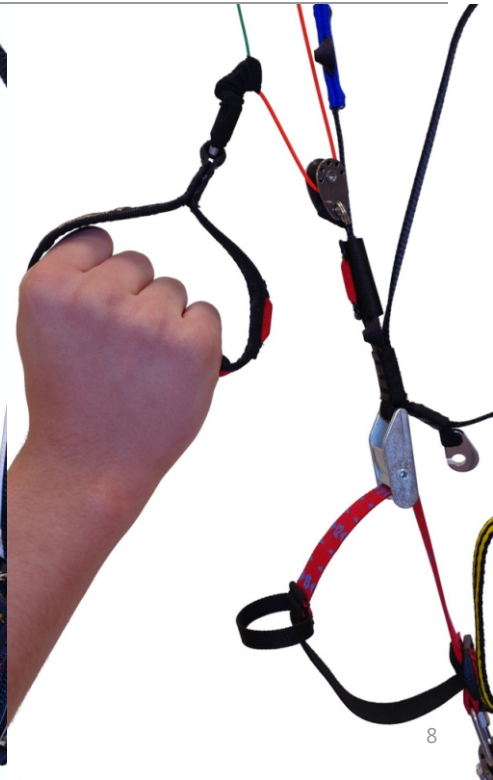
EK

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 minimalizing 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

Correct matching of the canopy and the paramotor belongs to the pilot.

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

Weight range

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

Exceeding maximum take-off weight described in technical data of the paraglider ("Pilot's weight incl. equipment") increases risk of an accident in case of pilot's error.The smaller canopy area as compared to take-off weight, the greater the risk.

Paragliders considerably change their character due to increased load and each experienced pilot should perfectly understand that.

The biggest danger induced by overloading the canopy is its hyperreactivity.

Caution: Check your real take-off weight! Some pilots calculate their take-off weight by just summing up catalogue numbers, e.g.: paramotor 29 kg + canopy 6 kg + pilot 87 kg = ca. 120 kg. In fact your actual take-off weight can be umpteen kilograms bigger. Most often we forget the clothing, electronics, backpacks, sometimes even such basic things like fuel or rescue chute weight are omitted!

What harness?

For free flying you can use any certified harness which has its hangpoints at 40-45 centimeters from the seatplate.The width between carabiners should be somewhere between 40 and 45 cm.

CAUTION: Please note that any modification of seat/hang point distance changes the position of the brakes as related to pilot's body. You must remember that in each harness your steering range will be different.

Adjustment of the steering handles, the pulley and the speed system.

! 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.

The Universal risers are shorter than in most paragliders, thus alleviating potential problem with different hangpoints. There are four places to fix the steering lines pulley – upper lengthened upper, lower, and middle (see risers diagram on p. 6). On the main steering line there are three points marked, indicating where to fix steering handle depending on pulley placement.

For free flying you shouls fix the pulley on the end of the extending loop, placed at the first upper hangpoints, and the steering handles on upper positions marked on the steering lines (so that steering lines are effectively shortened). This is the factory setting of the paraglider (unless ordered otherwise).

See adjusting the pulley and steering line marks according to the hangpoints on next page.

Generally speaking, upper hangpoints require longer steering lines, while the lower hangpoints – shorter lines.

Before you will take on powered flight it is recommended to try the setup out.

Hang up the entire PPG unit with ropes, sit in the harness and ask someone to pull the risers up. You must make sure that in flight you will always be able to reach the brake handles, even if the airflow blows them away.

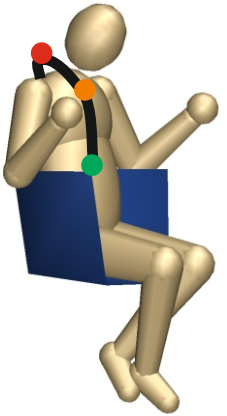
Being suspended in this way you have a perfect opportunity to adjust the speed system lines too. The speedbar when not in use must not pull the lines nor risers. Neither should it be too loose, for it could then get into rotating propeller.

An additional way to check the whole configuration out is to visit a take-off site in steady winds of ca. 3 m/s. With the engine off, inflate the wing and take it up over your head.When it stabilizes, check that the brakes are completely loose and do not affect 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 importantly, the setting must always be symmetrical.

! **Caution:** Ill-adjusted steering lines can be a reason for wrong assessment of the canopy state, and/or can cause dangerous deflations on high speeds when too short.

How to match the pulley level and steering line mark with the suspension height.



1 Pulley in first position (upper lengthened), EK magnet mounted over second pulley position.

2 Pulley in first position, EK magnet mounted over buckle of the trimmer.

3 Pulley in second position (middle), EK magnet mounted over buckle of the trimmer.

4 Pulley in third position (lower), EK magnet mounted over buckle of the trimmer.

Pre-flight check

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 that 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.
- make sure the launch area is clear and free.

When launching with a paramotor, additionally check if:

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

Free flight

The main difference between the Universal and other paragliders is that due to its increased tuck-resistance (both during launch and flight) and greater speed range (when using the trimmers) it can be safely flown in strong conditions too.

Classic (forward) launch

Should be used with little or no wind. After pre-flight check, facing the wind place the risers over your shoulders (A riser should lay on top).

Clip it into carabiners and lock them. Grip the brake handles and A-risers, holding them at the stitching, just under the quick-links. To make things easier, A-risers have been markedwith a red cover. Spread out your slightly bent hands, keeping them down and back.

All other risers should be placed near your elbow joints.

Apply some tension to check if the A risers stay on top and the lines are not tangled. Take a step back, bow down a little and run forward. After the initial inflation smoothly move the hands with the risers up and over your head until the wing will be directly above you. Let the A risers loose and check the wing.

Pump out possible faults and keep an eye on position of the paraglider. Side drift is corrected best by moving yourself always under center of the canopy. In order to keep wing in the air the suspension lines must stay taut all the time, so in light winds you will have to run forward. With stronger winds you can control the wing while standing still.

When leaving the ground apply some brakes, then release it after gaining some distance from the ground. Keep your hands relaxed.

Reverse launch

To be used when wind speed exceeds 3 m/s.

After clipping the risers into carabiners as for the forward launch, turn back to face the wing, moving one riser group over your head. As a consequence, you will have the risers crossed.

Unclip the brake handles from rear risers and grip it outside of the risers without crossing neither arms nor lines. In this way you steer the left side with you left hand and vice versa. Now take corresponding A risers on both sides (still keeping brake handles in your hands).

Make sure that the wing inflates symmetrically and the lines are not tangled. Building up tension with a few steps back and

simultaneously lifting the A risers (do not pull them towards you) will make the paraglider rise.

When it arrives over your head, stabilize it with the brakes, check again if all

lines are clear and the cells inflated.

When turning into wind, remember to turn the right way

(hint: always do it the same direction) and to keep the lines strained at all times. The turn itself should be quick and smooth. While turning you have to release the brake handles and grip them again facing forward, so that again the left one is in the left hand etc. Last check of the wing & free space to launch and off you go, running into wind with eventual light braking when taking off.

Remember!
When deflating the canopy in strong winds (e. g. aborting a launch), use the C risers, not the brakes. Using the brakes in strong wind can lift the pilot up and drag him/her back.

! **Caution:** When clipping in the crossed risers, you can find proper connection of the speed system particularly hard. Be careful not to confuse the risers!

! **Caution:** During start, especially winched or with a motor, 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. As a result it can stay behind a pilot, if he neglects bringing it directly over head during launch.

Flight

The increased speed range of Universal (in case of trimmers operation) may demand some attention in flight. Nevertheless, once you have mastered these additional assets, flying will become pure fun. Good handling will let you make best use of thermals, and increased speed on transitions means that your presence in sinking air will be shorter. To avoid stalls when braking with closed trimmers, their movement is restricted by the tape sewing.

Turns

Universal 1.1 is an agile wing, with smooth reactions to all pilot's actions. Handling is actually easy and forces grow proportionally to position of the brakes. Adding some weight shift will make the paraglider turn really quick and tight.

The combined technique (weight shifting and brake input) is by far the most efficient method of turning. Turn radius is then determined by the amount of inside brake used and weight shift. Additional application a little outside brake after initiating the turn with maximum weight shift increases turn efficiency and the outboard wing's resistance to collapse (in turbulence, the edge of a thermal etc).

In case of necessary turning in confined area at slow speed (e.g. slope soaring), it is recommended to steer the decelerated canopy by loosening the brake at the outside of the turn while applying just a little more brake on the inside.

! **Caution:** when entering a turbulent area you should brake a little to put up the tension. It will allow you to react instantly in case of a problem. Too hard or too quick pulling of one brake can cause the wing to enter a spin.

Thermalling and soaring

When flying the Universal 1.1 minimum sink is reached with slight brake pressure applied (10 to 15 cm, depending on pilot's weight). In turbulent conditions the canopy should be flown with a small amount of brake applied. This improves overall stability by increasing the angle of attack of the canopy. The canopy should neither rock back nor surge forwards, but always stay above the pilot. In order to achieve it, the pilot should accelerate the canopy by letting off the brakes when entering a thermal (according to its strength) and brake it on exiting. This is part of basic active flying that can spare you many potential collapses.

When soaring the slope, minimum height of 50 m above the ground is recommended for safety reasons. It is important to comply with air traffic rules, especially when many pilots share airspace close to the hill.

The avoidance manoeuvres often happen to be impossible in such conditions.

Trimmers and speed-system operation

When flying into head wind or through sink it is advisable (for the sake of best glide angle) to increase speed, as long as conditions are not too turbulent.

Full application of the speed system increases flight speed by some 30%. In contrast to most paragliders it does not decrease wing stability significant, but if you meet some serious trouble, it is advisable to release the speedbar. The faster you fly, the more dynamic colapses can happen. With application of the speed

system the brake forces increase, and brake effectiveness decreases.

At maximum speedbar and fully opened trims we strongly recommend steering with TST handles or TEA lines. 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.

Landing

Just make sure that last turn into the wind is done with sufficient altitude. At about 1 meter over ground flare out by gently braking both sides. The glider may climb again for a while gaining some height, if too much brake is used.

! **Caution:** Strong wind landings hardly require braking, if at all! Use D-risers to deflate the canopy after landing. Using the brakes will probably result in pilot being lifted again and dragged backwards.

The final glide of the landing approach should be straight and smooth. Steep or alternating turns can result in a dangerous pendulum effect near the ground.

WINCHING

Our paraglider has been successfully tested for foot launching by winch.

During winching trimmers should be set in closed position (0).

First phase of the winch take-off is analogous to classic launch.

After rising the canopy you will be taken off the ground, as the winch line gets loaded. Avoid large heading corrections in first stage of flight up to altitude of 50 meters.

During this stage do not sit deep in the harness in order to be ready for emergency landing in case of e.g. winch line break.

Make sure that your brakes are fully released, so that angle of attack does not increase above safe level.

During all winch it is recommended to control the direction by weightshifting only. Steering lines should be used only for considerable heading corrections, but even then do not pull them too much in order to avoid danger of stalling your wing.

Adjust your heading regularly when winched, so no large corrections are necessary. Remember there are several conditions to be met when winching:

- pilot should be properly trained for winching,
- the winch with all gear should be in good condition and specialized for paraglider winching,
- the winch operator must be properly trained in winching and servicing the gear,
- Universal 1.1 must not be winched with forces exceeding 90 daN, and under any circumstances must not be towed by any vehicle not equipped properly or controlled by unskilled operator.

First powered flights

In order to get familiar with your wing we recommend at first flying with the trimmers closed since in this configuration the Universal 1.1 behaves as a classic wing.

Once you feel confident with your wing, you can start experimenting with faster trim settings and speed system. Use all additional speed and vigor of the Universal 1.1.

! **Caution:** Before each launch it is necessary to have a thorough check of the paraglider, harness and power unit (see page 14).

Classic launch with no wind

Even when it seems that there is no wind at all, it is rarely so.

Therefore always be careful in determining the conditions, since in PPG flying it is most important that the launch and initial climb are performed with a head wind (the danger of losing your airspeed while steep crossing of the wind gradient is greatly reduced then). 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 (0). 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 Universal 1.1. 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.

Reverse launch in strong wind

Reverse launch can be executed while holding in one hand both A risers and one brake, with throttle and the second brake in the other hand.

With a decent wind it is by far the best way to launch.In weaker wind it is better to prepare a classic launch, as running backwards with a paramotor on your back is not the easiest thing to do. It is reasonable not to pull the wing up until you are really determined to launch, especially when it's already clipped in.

Lay down the rolled paraglider with its trailing edge against 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 right and left one.

We suggest that you lay the risers in the same way as you will be turning during reverse launch, and place one riser over the other, with 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 practically impossible (with the canopy lying still).

Now run the pre-launch checklist (see page 14).

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 inflate the canopy. The Universal 1.1 comes up easily and sometimes may require a dab on the brakes to stop it over your head.

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.

Remember:

- You are launching with your hands crossed. You have to really master this technique before trying it with a running engine on your back.
- 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.

! **Caution:** When clipping in the crossed risers, you can find proper connection of the speed system particularly hard.

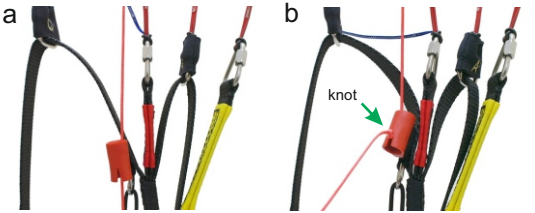
Be careful not to confuse the risers!

To avoid this you can:

- when in the ground clip in the risers unsymmetrically, using different carabiner hangpoints,
- change the throttle setting and/or
- adjust the cross bracing to counteract the torque, if there is one present 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 settings.

The best method is to fasten opposite cross-bracing, or apply some weight-shift. Such oscillations usually occur at full power - the greater the engine output and propeller diameter, the bigger the swings. In addition pilot reactions are often too late or wrong, increasing the problem instead of solving it. In this case a simple way to deal with this question is to close the throttle and release the brakes. Especially less-experienced pilots tend to overreact. This is called a pilot-induced oscillation, and proven solution is to leave the 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 or the additional inner loop show below, where the risers are clipped. However, there is no adjustment there – in the TEA the knot can be put precisely where needed to completely stop the torque.

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 Universal 1.1 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 Universal 1.1 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 or harness' cross-bracing.

The risers of the Universal 1.1 feature double main carabiner loops (upper and lower), as well as our TEA system. Asymmetric clipping the risers and /or pulling the knot down through the tube are the ways to counter the torque effect when your paramotor is not equipped with cross-bracing. For the TEA system to work properly you have to 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 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 and propeller diameter can cause serious oscillations, during which the pilot is being lifted to one side by the torque effect, swings down due to his weight, then is lifted again and so on.

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 Universal 1.1. 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 Universal 1.1 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 and speed-system operation

The reflex airfoil of the Universal 1.1 means safe operation of the trimmers and speed-system in a wide range. You are free to experiment with all possible settings, as long as you are on safe altitude.

The trimmers belong to basic steering instruments. Their use should be widely understood, nevertheless we woul like to underline some basic rules concerning safety.

The trimmers must always be released (activated) symmetrically.

Full release of just one trimmer will cause the paraglider to enter a turn, and extreme cases can lead even to a spiral. A canopy reacts to unsymmetrical trimmers depending on its model and current take-off weight (the bigger weight, the more dramatic reaction).

The only exception from the symmetric trimmer operation rule are slight differences in settings necessary for course adjustments.

When you intend to release the trimmers, follow this procedure:

- grab the trimmer buckles,
- press the locks of both buckles with your thumbs,

- once you feel both locks to let go, allow the trimmer tapes to slowly slip out.

In this way you will be able to release the trimmers as muchas you intended to, in a controlled action.

Closing the trimmers should be symmetrical too, pulling both tapes simultaneously.

Trimmers must be activated on a safe altitude, with enough margin for error.

In case of unsymmetrical trimmer release:

- correct flight direction with a brake,
- release the other trimmer (when altitude allows), or close the previously released trimmer.

Trimmers and reflex profile

Trimmers in the Universal 1.1 affect geometry of the airfoil. At closed trimmers the airfoil features generates more lift with decreased reflex character. The more trimmer is released, the more reflex there is.

In order to avoid stalls when braking with slow trimmer settings, their movement has been restricted. (Note: it is physically possible to push the sewn trimmer tape through the buckle in order to replace it, however in normal operation the trimmer must be pulled up to the limiter only!)

Please note the wide operational speed envelope of the Universal 1.1 achieved by trimmers only. Due to such wide range we've decided to introduce capability of restricting that range (before the launch) by the pilot according to his skills and preferences. Even when the trimmer range is restricted by half, applying the speedbar in urgent needs allows for almost maximum speed. Restricting the trimmer range is shown in „Adjusting the trimmers" appendix in this manual.

Always when you are flying at high speed, be it with released trimmers or with additionally engaged speed system, your steering inputs must be smooth, with no rapid movements. When accelerated, the reflex wing canopy is often lacking support of the rear line rows – they are loose. Rough yanking of steering handle changes the pressure distribution and trimming of an airfoil. The airfoil can rapidly increase pitch and aggressive tuck will follow.

Slow trimmer settings decrease sink and steering forces, so it is possible to efficiently use the thermals.

Study drawings of trimmers and speed-system adjustment and setting, as well as their influence on the wing shape.

Remember:

- Trimmer setting is another part of the pre-start check list!
- If it will be asymmetric, the wing will be constantly turning.

Speed system

Directly affects the angle of attack and unlike the trimmer does not alter the airfoil geometry. Using full speedbar in case of the Universal 1.1 increases speed by ca. 30%. Contrary to most of the paragliders this is not connected with the stability loss, nevertheless when considerable turbulence is encountered the speedbar should be released.
In order to retain stability of the wing, first thing to do is to release the trimmer so that the alteration of the airoil is decreased or completely aborted, and only the press the speedbar. If the trimmers stay closed, speed system will be inclining a modified airfoil.

Speed and steering

We can discern three basic speed configurations (meaning setting of the trimmers and the speed system operation):

Trimmers completely closed (position 0):

- pilot uses the steering handles.

Trimmers partly released (position 6 – risers level):

- pilot can use the steering handles, however with increased effort;
- steering the wing via TST handles will be definitively more effective.

Trimmers fully released with or without speed system engaged:

- In this configuration pilot should not use main steering handles,
- flight direction may be corrected only with the TST handle or TEA line!

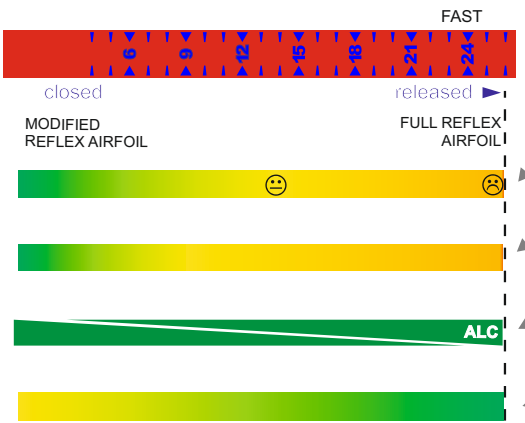
Caution: The safest way to change your course at high speeds is to use the TST or TEA especially in rough air.

Turns executed in this way will be slightly wider, but the necessary steering force will be far lower, and speed will not drop while turning.

Any yanking or rapid deep pulling of the brakes can dynamically disturb the pressure distribution over the airfoil and therefore its actions.

This warning is valid for any paraglider, the Universal 1.1 is no exemption here!

Trimmer operation tips



In nil wind conditions the launch is easiest at completely closed trims. The stronger the wind, the more you can open the trimmers. Nevertheless, launch on fast trim settings will be hard or outright impossible (depending on wind speed).

Thermalling is most effective at closed trimmers. In case of strong turbulence it is advisable to partly open the trims, thus increasing overall stability.

Main brakes and the ALC can be used both simultaneously and/or alternatively. The brakes will be more effective at slow settings, while the ALC at faster ones.

Torque effect adjuster can be used for correcting flight direction in fast configurations too (trimmers/speed system). It works the same way as the TST used in our older paragliders.

1 Steering with just the brake handle (trimmers colsed - slow mode)

2 Brake handle + TEA line (trimmer partially released - accelerated mode)

3 Steering with the TST only (trimmers partially or full released - accelerated mode)

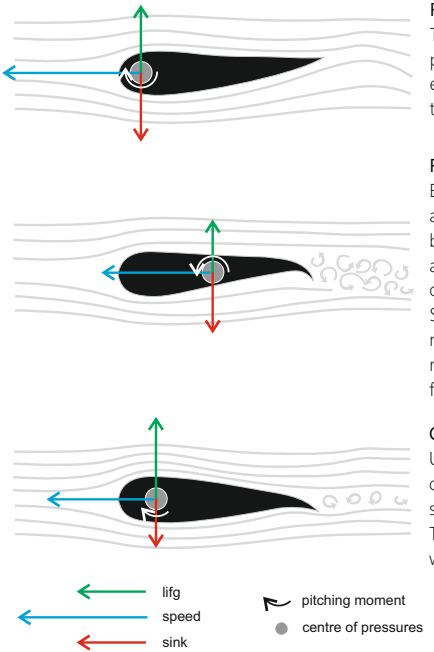
4 Steering with TEA line (trimmers partially or full released - accelerated mode).

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 (especially with speedsystem engaged). Steering the paraglider in such configuration is most effectively done with TST handle (ALC+ line) 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 (especially when fully accelerated) 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, nebertheless 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.

Trimmer settings influence on the airfoil

Trimmers colsed

- lowest speed,
- minimum sink

Launch confoiguration

A - 490 mm
A' - 490 mm
B - 475 mm
C - 450 mm
D - 425 mm

Trimmers in neutral position

- neutral risers' length,
- in-the-middle position.

A - 490 mm
A' - 490 mm
B - 490 mm
C - 490 mm
D - 490 mm

Trimmers fully released

- maximum speed

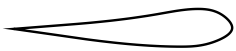
A - 490 mm
A' - 490 mm
B - 535 mm
C - 605 mm
D - 665 mm

Lengths of the risers incl. quicklinks, length tolerance +/- 5mm

Trimmer settings influence on speed system action

Full acceleration on closed trimmers

- offers good speed,light steering but decreased stability,
- classic speed system operation



A - 410 mm
A' - 410 mm
B - 415 mm
C - 420 mm
D - 425 mm

Full acceleration on completely released trimmers

- low angles of attack and maximum speed,- high stability and hard steering,
- ALC+ (with TST toggles) or TEA steering advised

A - 410 mm
A' - 410 mm
B - 460 mm
C - 540 mm
D - 665 mm

Lengths of the risers incl. quicklinks, length tolerance +/- 5mm

Landing

Basically in PPG flying there are two kinds of landing: with and without power.

Power off landing

At an altitude of ca. 50 metres switch the engine off and glide as you would 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 – it has to be done right!

Trimmers must be fully closed (0) or slightly released (2 to 3 cm), depending on individual preferences and weight of the pilot (same position as you would for launching).

With or without power Universal 1.1 better copes with turbulence on partly open trimmers, so if the conditions are rough, better make an approach with greater speed, plan a lot of free space (as for a hangglider) and wear that speed off before touching down. Universal preserves the energy well, so there is a long float necessary, exchanging the abundant speed for lift with your brakes.

If the landing field is not big enough and you have to land on the spot, we advise you to set the trimmers in slower settings. It will increase lift coefficient of the wing, effectively decreasing its sink rate and speed. Such an action is especially important when flying with high surface loading.

Powered landing

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 if anything goes wrong. Still, if you forget to switch off the ignition before the wing falls down, there is considerable risk of

damaging propeller, catching lines in it or even suffering injuries connected with falling 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 (red cover) by ca. 20-50 cm. While inducing big ears you should never let the brakes out of your hands. After tucking the tips in, the Universal 1.1 will continue to fly straight with increased sink rate (up to 5 m/s). You can steer the wing pretty efficiently by weight-shifting.

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

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. Executing big ears with opened trimmers is very difficult due to reflex profile stability.

! **Caution:** Never try to pull big ears during powered climb, as the increased drag of the ears can cause excessive angle of attack and a parachutal stall. Besides, pulling the ears while climbing is pointless anyway.

B-Stall

B-stal can be executed only with completely closed trimmers (i.e. pos. '0').

To enter a B-stall, simultaneously pull down both B-risers (yellow cover) by ca. 10-15 cm. The canopy will collapse across the entire span along its B-row, the airflow over top surface will break and projected canopy surface will be decreased.

Forward movement will be almost completely stopped.

Further pulling B-risers is not advised, as testes have shown it to increase wing instability. If the canopy forms a horseshoe, gently pull both brakes to recover.

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.The surge forward is minimal due to stability of thre reflex profile, so braking is not necessary.

Spiral dive

Universal 1.1 is an agile paraglider, so it enters spiral dive very quickly and can surprise the less experienced pilot.

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 wimgovers 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 unnecesarily close to their maximum values.

Wing over

You make a wingover by performing a series of consecutive, alternating turns with growing bank angle.

Too aggressive banking with unsufficient control can result with a massive collapse.

Aerobatics

Universal 1.1 was not designed to do any aerobatics.

Caution: All rapid descent techniques should be practiced in smooth air and only with sufficient extreme manoeuvres 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 have dangerous consequences.

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

Extreme manoeuvres

Caution: Due to high resistance of the Universal 1.1 against both side and front collapses, we strongly recommend not to provoke such situations at trimmers settings other than closed, even during safety trainings. Inducing collapses in standard way can be very hard to impossible, while unconventional attempts can result in extremely violent and dynamic behaviour.

Extreme flying manoeuvres should only be carried out during safety training courses (instability training) under proper guidance!

One sided collapse

When the trimmers are fully opened or the speed system is engaged, collapses practically do not occur and can be induced only by a very strong turbulence. Still, if it happens, a little counter-steering is enough to keep the Universal 1.1 on course or at least decrease a swing of the canopy toward collapsed side. Under normal conditions with collapses up to 50% of the wingspan, the Universal 1.1 will reinflate instantly and spontaneously. If not, you should aid this process by application of a brake on the collapsed side.

Frontal collapse

The reflex profile of the Universal 1.1 makes it practically impossible, especially at higher speeds. Any forced attempts 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

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 Universal 1.1 does not jump forward excessively.
- after big ears execution, engage the speed system. 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, simply apply some pressure on speed bar and/or push the A risers forward.

Line over and cravatte

Universal 1.1 is a modern wing which, in order to decrease drag has fewer suspension lines and greater distances between them. Therefore 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 that renders normal steering impossible, you can safely steer and land Universal 1.1 using the D-risers (blue cover) or stabilo lines.

Cleaning and storage

Universal 1.1 design incorporates modern technologies, including nylon lines in the leading edge. That's why the paraglider should be carefully packed, with proper conditions ensured for transport and storage.

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 you 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 the wing becomes damp even while lying on green grass in direct sunlight, 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 tests have shown that color bleeding/transfer can happen even at 50 Celsius degree. 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 the wave forces 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:

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 mountain wings (MPG), speedflying, 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.

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

AeroCasco

12AC
12 Months Auto Casco

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 Paragliders 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 Euro.

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

AeroCasco covers only damages occuring 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 discoloration, damages caused by incorrect storage damage ot 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:

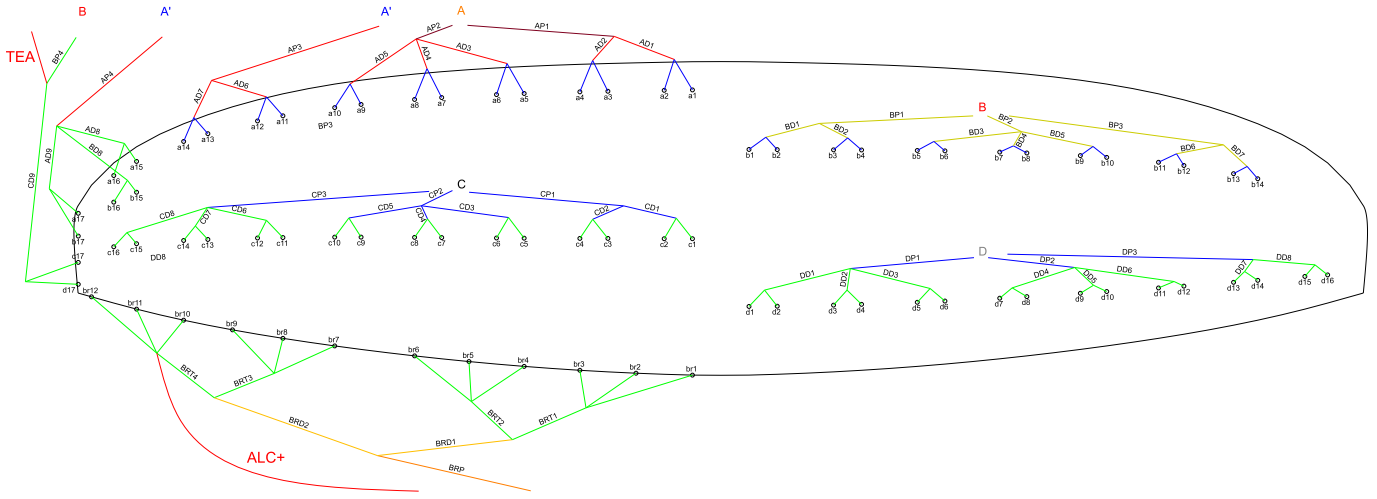
- a backpack and fastbag
- transport bag (with your canopy inside)
- the paraglider itself (canopy, lines and risers)
- compression strap to keep the canopy together
- speedbar (Easy Catch – optionally)
- wingshell (optionally).
- wind indicator (windsock or a strap)
- pocket with paper work and repair 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
- small gifts

Universal 1.1	23	25,5	28	31	34
Certification EN	B	B	B	B	-
Approval - ULM identification	yes	yes	yes	yes	yes
Number of cells	50	50	50	50	50
Surface area (flat) [m2]	23,00	25,50	28,00	31,00	34,00
Surface area (projected) [m2]	19,83	21,98	24,14	26,72	29,31
Span (flat) [m]	10,83	11,40	11,95	12,57	13,17
Span (projected) [m]	8,71	9,17	9,61	10,11	10,59
Aspect Ratio (flat)	5,10				
Aspect Ratio (projected)	3,83				
Sink rate [m/s]	min = 1,1 + - 0,2				
Speed [km/h]	min = 23; trim = 37 – 52; max = 57 + - 3				
Max. cord [mm]	2612,00	2751,00	2882,00	3033,00	3176,00
Min. cord [mm]	601,00	633,00	663,00	698,00	731,00
Distance pilot to wing [m]	6,82	7,18	7,53	7,92	8,29
Total line lenght [m]	344,01	362,82	380,74	401,20	420,70
Total take-off weight - PG [kg]	60-75	70-95	90-115	110-140	135-170
Total take-off weight - PPG/PPGG [kg]	60-95	70-115	90-140	110-170	135-215
Distance betwen risers [cm]	42,00	46,00	46,00	46,00	45-60
Weight [kg]	5,60	5,95	6,40	6,85	7,35
Lines	Technora: 90 & 140 & 190 & 280 & 340 & 420				
Fabric	Porcher Classic 38 g/m2 & Dominico tex 34 g/m2				
	Porcher Hard 40 g/m^2				
	SR Scrim, SR Laminate 180 g/m^2				
Risers	PASAMON - Bydgoszcz, Polska				

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).


B
A'
A'
A
TEA
BP4
AP4
AP3
AP2
AP1
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD8
AD9
BD8
CD9
BP3
a14
a13
a12
a11
a10
a9
a8
a7
a6
a5
a4
a3
a2
a1
a16
a15
a17
b16
b15
CD8
CD7
CD6
CP3
CP2
C
CD5
CD4
CD3
CP1
CD2
CD1
c16
c15
c14
c13
c12
c11
c10
c9
c8
c7
c6
c5
c4
c3
c2
c1
DD8
d17
d16
br12
br11
br10
br9
br8
br7
br6
br5
br4
br3
br2
br1
BRT4
BRT3
BRT2
BRT1
BRD2
BRD1
BRP
ALC+
BD1
BD2
BP1
B
BP2
BD3
BD4
BD5
BP3
BD6
BD7
b1
b2
b3
b4
b5
b6
b7
b8
b9
b10
b11
b12
b13
b14
DP1
D
DP2
DP3
DD1
DD2
DD3
DD4
DD5
DD6
DD7
d1
d2
d3
d4
d5
d6
d7
d8
d9
d10
d11
d12
d13
d14
d15

If you respect the rules of safe flying and proper glider care, you will enjoy many years of pleasant airtime on your Universal 1.1. 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!

Universal 1.1

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