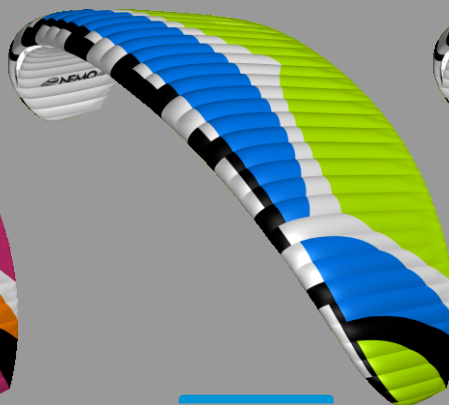
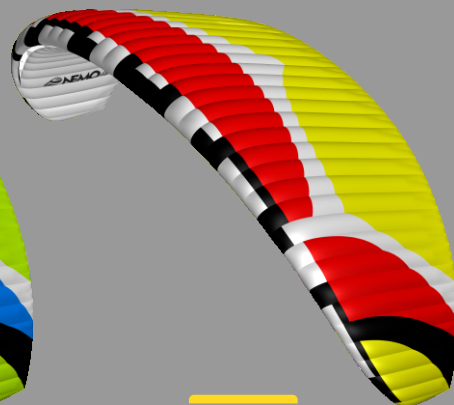


PASSION



HARMONY

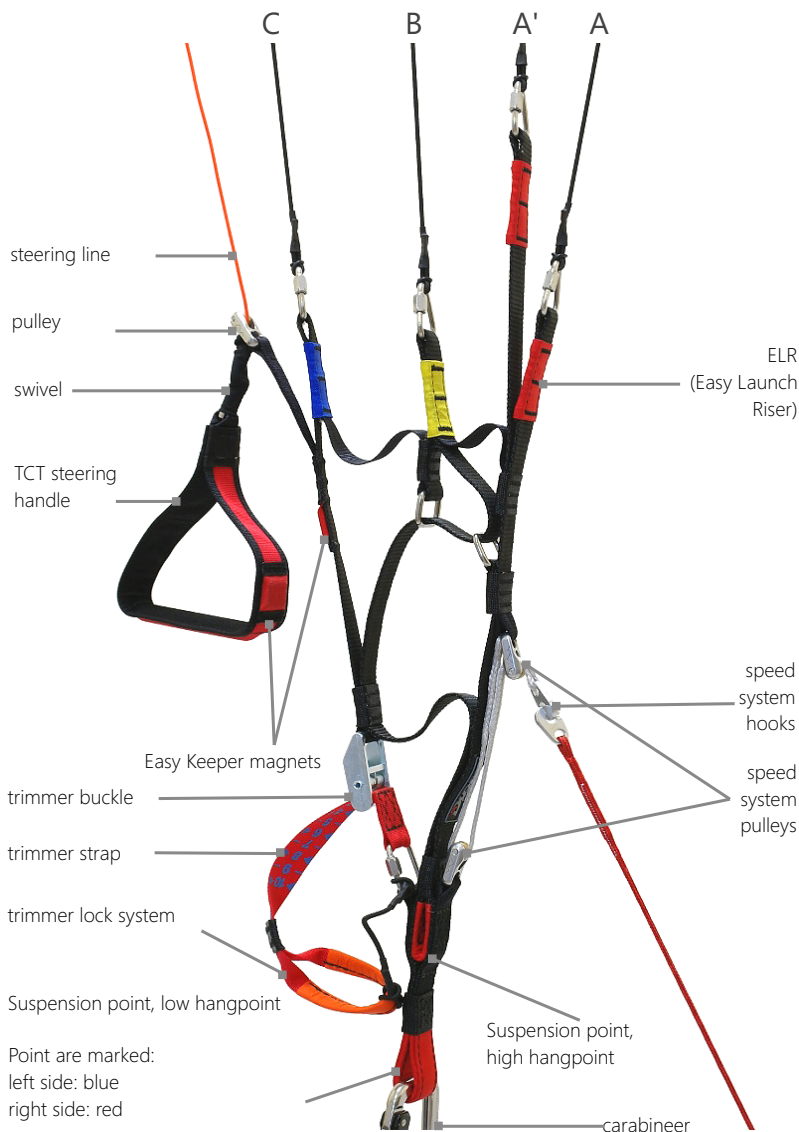


ENERGY

**INDEX****page:**

riser design  
launch  
flight  
influence of the brakes on reflex profile  
landing  
golden rules  
speed modes

3  
9  
12  
15  
16  
17  
18



### On MotoRisers

Our new universal risers for motorised paragliding feature two sets of suspension points. Because of that you don't have to adjust steering lines when you want to use your paramotor.




Beside trimmers MotoRisers have a speed system too, which can be used both for free and powered flying. Its operation is described in Nemo 4 manual.

In comparison with standard risers, here the C riser (blue) is connected with the other risers through a limiter, making impossible full depression of speedbar when trimmers are released. In result total difference of risers length does not exceed certified values. Speed system and trimmers operate alternatively or can act together, but in limited range then.




Suspension point,  
high hangpoint

MotoRisers for the Nemo 4 feature:

- ELR (Easy Launch Riser) - a facile launch system.  **Easy Launch Riser**
- speed system affecting A, and B risers,  **Speed System**
- trimmer with replaceable tape, affecting B and C risers,  **Trimmers**
- dedicated limiter of speed system and trimmers operation.

Our newest brake handle used in Nemo 4 besides its attractive, light design features:

- TCT system (Triple Comfort Toggle)  **Triple Comfort Toggles**
- a swivel – preventing possible twisting of the steering line,
- Easy Keeper system - see next page

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 ).

Suspension points for the main carabiners (lower suspension) are marked with colours too, to distinguish the sides:

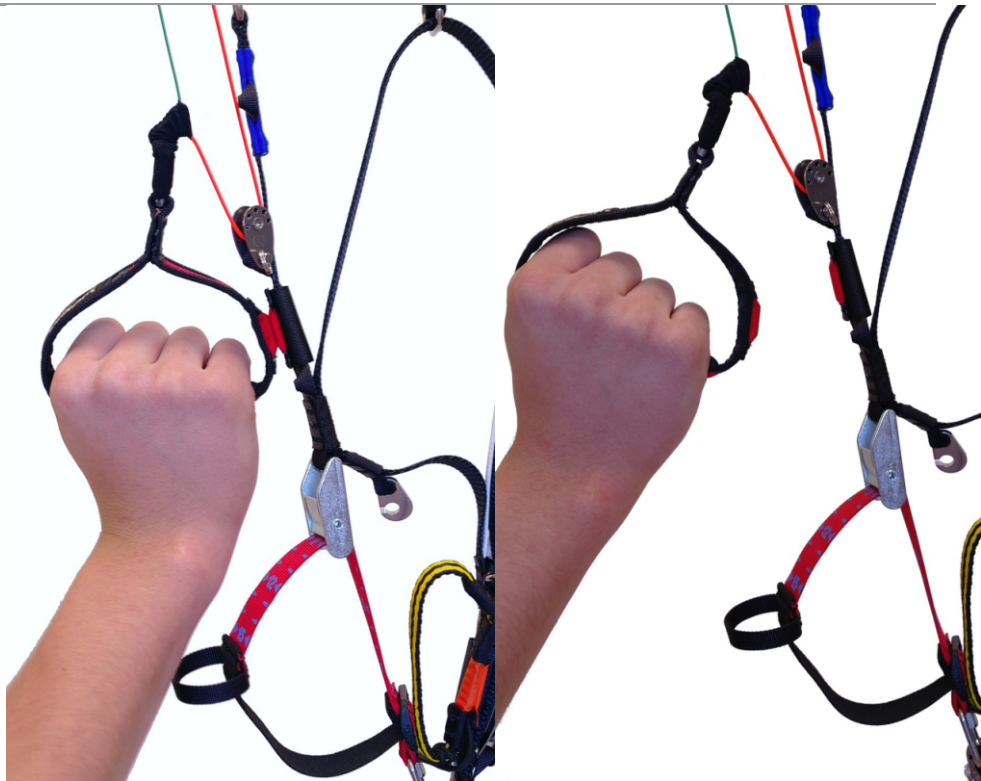
- red tape – right side
- blue tape – left side.

**EK**

### Easy Keeper

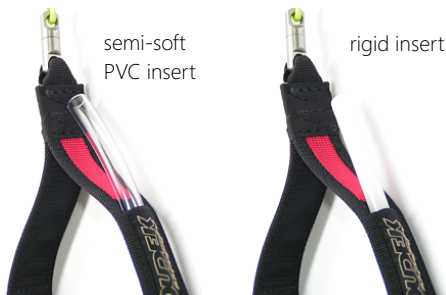
**Easy Keeper** is our indigenous way to hold the brake handles at the risers by using strong neodymium magnets. It keeps the handles firmly at the risers, while both attaching and releasing goes smoothly and easily.

The system allows for easy placing the brake handles on risers during flight, when they are not used, thus 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.



### Trimmer lock system

Putting the trimmer tape loop on the main carabiner will allow you to retain the EN certificate. At this setting you can use the speed system in its full certified range, without possibility of applying the trimmers.





## First flights

In order to get familiar with your wing we recommend flying with closed trimmers first (0), because in this configuration Nemo 4 behaves like 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 brake travel.

Once you feel confident with your wing, you can start experimenting with faster trim settings and speed system. Learn to use all of the additional speed and safety of the Nemo 4.



**Important:** Before each start it is necessary to have a thorough check of the paraglider, harness and power unit.

## 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 crossing the the wind gradient is greatly reduced). Special attention must be paid to trees, power lines and other obstacles, including the possibility of emerging rotors.

## Paraglider preparation

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. Set the trimmers completely closed. In 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 check if:

- the helmet is on and locked,
- the risers are clipped in the carabiners,
- the trimmers are properly set,
- nothing will get in propeller's way,
- speed system is running without problems,
- steering lines and handles are free and not twisted,
- the engine delivers full power,
- take off area is clear of obstacles and free to use.

When you are sure everything is OK, you can clip in the wing and execute launch as in free flight.

From now on you should steer the paraglider facing forward, without looking back over your shoulder (when the wing is low behind you, turning can cause some lines to get in the propeller). Still, 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 the strain on both risers to be equal, make sure the canopy is overhead, 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 preserving starting direction. If the wind suddenly drops, give a stronger pull on the risers. If the paraglider falls to one side or back too far to be lifted again - kill the engine, interrupt launch and check 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 well and the lines are not tangled, but do so neither stopping nor turning. 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 collision with the propeller. Before giving it full power, see that the cage does 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 power 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 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. In weaker wind it is better to prepare a classic 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 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 the 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. 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 canopy over your head.

Once you have it overhead, turn around, open the throttle and take off.

#### 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.



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

## 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 - due to the additional drag actual rate of climb will worsen, and with the throttle fully opened even a stall can happen.

In powered flight, if there are no obstacles present, it is by far safer (and more impressive for the spectators) to fly 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. 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 be counter-steer it with a brake or harness cross-bracing. You can also release one trimmer a bit (by a few cm) opposite to the turning moment.

When climbing steeply with slow trim settings and high power output beware of the possibility of stall.

## 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.

To avoid this you can:

- change the throttle setting and/or
- adjust the cross bracing to counteract the torque, if there is one present and/or
- shift yourself to the other side of the harness and/or
- change the trimmer setting.

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 there are often too late or wrong pilot reactions,

increasing the problem instead of solving it. In this case the safest way to deal with this question is to close the throttle and release the brakes.

Especially less-experienced pilots tend to overreact. This is called a pilot-induced oscillation, and proven solution is to leave the brakes alone.

### Level flight

Once you have gained safe height after take-off and wish to go for a route, you can turn onto the right direction, fully open the trimmers and let off the brakes. If the conditions are turbulent, we recommend flight with closed trimmers and steering with the brakes.

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

Of course each flight will depend on current configuration of your gear, but due to its ability to fly safe the Nemmo 4 will let you adjust everything to the best effect. Good knowledge of weather conditions (e.g. wind at different altitudes and smart use of thermals or dynamic lift will help you greatly reduce fuel

consumption and increase flight range. Of course the engine is always there to bring you in the right place.

Do not hesitate to lead the Nemo 4 into tight thermalling in order to win some altitude and spare fuel. In order to make the best of the thermal, completely close the trimmers.

### Trimmers and speed-system operation

Trimmer unit consists of trimmer buckle holding red trimmer tape with blue scale, finished with orange loop. The other end of the trimmer tape is fastened with a quicklink to the riser, so that in case of damage or excessive wear it can be quickly and easily replaced.

Two basic positions of trimmers can be distinguished:

- fully closed "0" – minimum speed and sink – best position for take-off and landing
- fully opened – maximum speed and sink

The trimmers enable control of the torque (with asymmetric setting) and increase the speed without engaging speed-system.

When free-flying you can put the orange trimmer loop on the main carabiner, thus retaining the EN certificate.



**Important:** It is advised to engage the speed system with closed trimmers (position "0"). If engaged with opened trimmers, a dedicated limiter will stop movement of the C (blue) risers beyond certified range in EN tests.

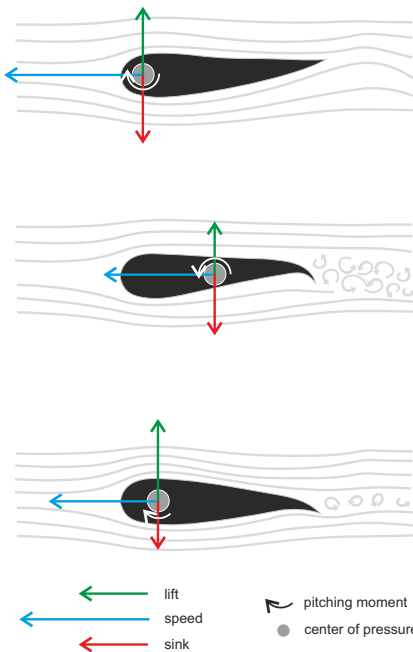
## Influence of the brakes on airfoil effectiveness when accelerated

Pilots used to classic canopies without trimmers tend to fly "actively", with steering lines constantly under tension. Such piloting of a canopy with released trimmers is totally ineffective and can even be dangerous.

Basic rule when flying both accelerated and on released trimmers says: steering must be smooth, with no aggressive inputs, using no more than 25% of the total steering range.

In case of encountering massive turbulence we advise to close the trimmers completely and take active control of the canopy via steering lines.

See following drawings.



### Released trimmers without brakes operation

Fast flying setting.

Due to partial modification of the aerofoil with dedicated riser system, centre of pressure of the aerofoil is moved forward.

### Released trimmers with brakes applied

Even slight brake operation (especially when fully accelerated) will move centre of pressure backwards, and the torque will decrease the angle of attack. Additionally, the airflow is considerably disturbed. In particular cases this can cause a collapse. Steering lines operation may be necessary for corrections of the heading, nevertheless when flying straight line steering handles should be fully released. Otherwise they will alter the equilibrium of the aerodynamic forces affecting the profile.

### Closed trimmers

Operating the brakes is in this configuration a typical steering mode and does not cause any danger. Such setting is used during launch, landing and thermalling. The canopy is configured exactly as during the EN tests.

When piloting at high speed, with opened trimmers and/or speed system, any steering inputs must be smooth and easy. In turbulent air releasing trimmers should be avoided, since in case of a collapse the canopy will behave more dynamically than during EN tests.

When flying slow (trimmers closed, position "0"), tight and effective turns can be made with differential brakes operation. Slight use of external brake (with engaged inner one) will compensate for loss of lift due to bank angle. Moreover, turns can be assisted with opening throttle, engaging speed system etc. Once with accumulated experience you will master these techniques, you will be able to execute smooth, fully coordinated turns.

## Landing

In PPG 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 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 - so it has to be done right!

If the landing field is not big enough and you have to land on the

spot, we advise you to set the trimmers in 0 position (closed). 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 a 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 is always better to have 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, as on 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 and other places 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. You'll never know until you land and check it out!
- Be certain of your navigation
- Remember that not everyone is fond of your engine noise. Do not scare the animals.

## Trimmers closed ('0' position)

Minimal speed and minimal sink  
Take-off position



size:	20 i 23	25 i 28	31
A	515	535	555
A'	615	635	655
B	515	535	555
C	515	535	555

## Trimmers opened

Increased speed and sink



size:	20 i 23	25 i 28	31
A	515	535	555
A'	615	635	655
B	555	575	595
C	615	635	655

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



## Full acceleration with closed trimmers:

Full speed, increased sink



size:	20 i 23	25 i 28	31
A	390	390	390
A'	490	490	490
B	430	430	430
C	515	535	555

## Full acceleration with opened trimmers:

Full speed, increased sink



size:	20 i 23	25 i 28	31
A	490	490	490
A'	590	590	590
B	530	530	530
C	615	635	655

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





Dudek Paragliders  
ul. Centralna 2U, 86-031 Osielsko, Poland  
[www.dudek.eu](http://www.dudek.eu), [info@dudek.eutel](mailto:info@dudek.eutel). (+48) 52 324 17 40