

X duo_ EN B tandem glider

MANUAL

EN REV.V01 - 2020



Copyright by:

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SERVUS

There are those very special and rare scenes and encounters in time, when we indulge in the present, feeling the now and simply pure joy. The GRAVITY team has devoted its efforts, work and vision entirely to and around the pleasures and enjoyment to the art of flying. Not only do we all live the spirit and mind-set of safety and freedom every day, we also want to share it with as many people and like-minded airheads as possible! GRAVITY develops innovative products for paragliding and offers a full-service range with the great desire to make our products accessible to as many enthusiasts and sportsmen out there.

WE PROCLAIM -> Secured and lasting enjoyment!

GRAVITY strives for the highest level of passive safety, with inspiring, performing and convincing products that make you truly happy. Our products deliver reliably, supporting and aiding the pilot even in more challenging conditions.

It's simple that the fun factor increases significantly by reducing risk. Designing and manufacturing products, applying high, latest technological standards, originality with long-lasting quality.

AMBITIOUS DESTINATION -> Exceeding what is already great!

“Innovation is a trusted, strong driver and successful progress the best vessel!” With this we are aiming to improve, grow and develop personally and our devices every day. Evolving and advancing on certain thoughts and ideas about the current state of a product, how to improve safety and protection, including sustainability with fresh, out of the box angles and approaches. We are proud of our work, savour uncompromising quality and love our sport. The products are crafted and tested with utmost care, in order to create and maintain long lasting quality.

THE HEART OF TRADE -> man-kind

Managing the team responsibly and with care, treating our surroundings and nature with respect comes just as natural to us as how we communicate with each individual customer and pilot. The GRAVITY team and family keeps an authentic and plain management style. Evident, direct structures enable active, empowered interactions and makes us dynamic and flexible. We wish you many countless, lasting, impressive explorations and moments with your GRAVITY product.



Stefan Berger



owner & sales

Xduo



MANUAL

 **PAY ATTENTION_**

This operating manual is an important part of the aircraft. Please study and revise it well and in detail, due to the fact that there is a legal OBLIGATION to deal with the air sports device and its special features prior commissioning it. The manual is intended to make the use **of the GRAVITY Xduo** as safe and easy as possible.

1 THE PRODUCT_

1.1 GRAVITY Xduo_ high performance

A new era of tandem flight has begun. We managed to take the agile solo handling to the two-seater class with our Xduo for the very first time! High turn propensity while using low control pressure are making this glider a very efficient and fun working tool for every tandem pilot. The double seater reacts precisely and without any delay already with little steering impulses. With the handling being almost effortless, the pilot may even happen to forget that he is currently flying a tandem. The shark nose is delivering high performance as well as stability during all kinds of conditions and situations.

The Xduo is successful combination of high performance with highest safety standards. A long-lasting glider, using enduring, high-quality materials while emphasising air pleasure. The advanced two-seater is available in two configurations as GT or Pro version. Thereby the GT is aimed at ambitious tandem pilots and the PRO version is aimed at professionals.



Illustration 01_ GRAVITY Xduo

During the planning and development phase, much emphasis was put into creating outstanding take-off features. Even at zero-wind the Xduo fills itself, fast and effortless and rises over the pilot in a controlled manner. The low take off speed and a surprisingly short start run are offering a stress free take-off even with demanding passengers. But also during the landing the outstanding slow-flight features convince combined with the high performance potential of the wing for very good flair characteristics, making even the landing a simple experience for the passenger and the pilot. Low-weight of the canopy with high durability – that is what the smart material mix in combination with high quality processing of

the new Xduo promises. The top materials Dokdo 30 and Dokdo 20 are providing a low weight at high abrasion resistance.

For the **PRO version we used the specifically developed PX40** material, which is often and successfully applied in the acro scene. The extreme resistance to abrasion and tearing was a special topic and big matter when it comes to return on investment of professional tandem companies. The Xduo is covering a high weight range for a start weight from 140 kg up to 230 kg for one and two seated flying. Both versions have the LTF/EN B certification.



Illustration 02_ GRAVITY Xduo

Chief designer Ernst Strobl equips the Xduo with various constructive innovations. The PPN and the shark nose are providing a higher profile fidelity alongside the cell opening. Elaborate calculations of the ballooning in combination with the optimized pre-tensioning of the wing are ensuring the perfect flow around the profile. The High Pressure Crossport Design (HPCD) provides an ideal cross aeration of the crossport and ensures a balanced internal pressure in the whole wing. In the rear part of the wing Miniribs and the Break Gathering System (BGS) are providing an efficient force transmission of the brakes. The riser is equipped with an innovative trimmer system. The effective system prevents the warping of the profile, through not only accelerating the D and C level, but also the B level is being changed in relation to the angle of attack. Through that the form of the profile is being maintained, which leads to better gliding. On the D-riser a special clamping device is mounted, which allows the pilot to fixate the brake lines in any position. Therefore, even in turbulent conditions, you can take care of the passenger. A separated A-riser offers an easy way for doing Big Ears.

1.2 Pilot Profile

We designed and built the Xduo from scratch, placing much value into first class handling, which is clearly noticeable through the low control pressure. The double seater reacts precisely and promptly, already to the smallest control pulses and is therefore easily steered into curves and manoeuvred in general. It may occur that you forget you are flying a tandem at all. In terms of performance, the Xduo makes up for its surface area having a double effect. Working very efficiently in thermal lift and reliably transforms it into height and when in turbulent air, the glider stands solidly with precise feedback and a direct flight feeling.



Illustration 03_ GRAVITY Xduo

The shark nose is providing high stability and an extended inflow area. We doubled passive safety as it is a priority when flying with passengers. The canopy reactions are moderate and very damped accordingly, creating the sense of calm and composure in every situation.

1.3 Nature and environmentally friendly behaviour

We ask you to perform our sport in a manner, that impacts nature and environment with minimum intensity or as little as possible. Please do not walk off-track paths, don't leave any waste, don't make noise uselessly and respect the sensitive biological habitat in the mountains or any nature surroundings. Especially at take-off areas maximum care for nature is necessary.

1.4 Use

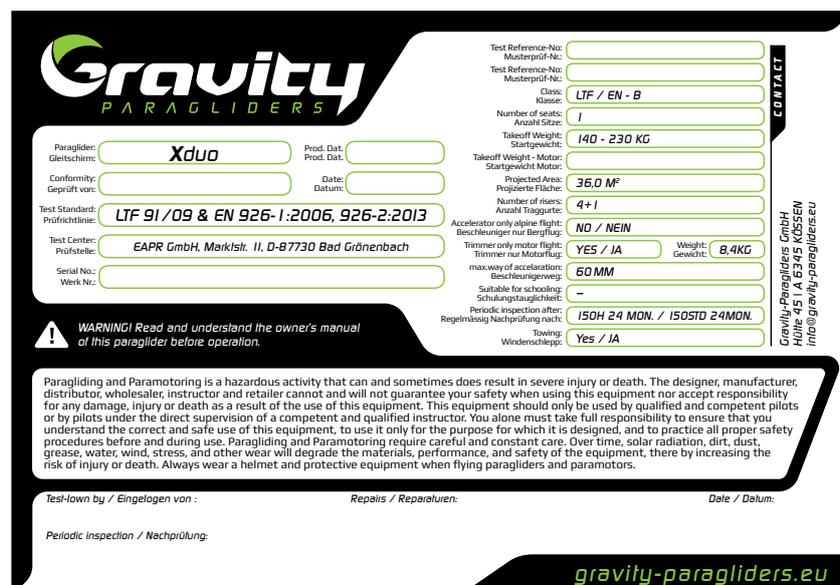
The Xduo was built for single-seat use only. The Xduo is a light air sports device, with an unladen weight of less than 120 kg in the paraglider division. The training-ready Xduo glider is an ideal wing and companion for beginners as well as advanced pilots. a wide range of pilots. The Xduo is sample inspected and certified according to LTF/EN B norm. The approval of the product was carried out and conducted according to current legal requirements and specifications:

- Inspection guidelines: LTF 91/09 & EN 926-1:2006, 926-2:2013

Accredited testing centre: EAPR GmbH, Marktstr. 11, 87730 Bad Grönenbach, Germany

1.5 Signboard

The essential and relevant product data is positioned on each product by default and in accordance to the admission office. In the case of the entire GRAVITY paraglider range these are visibly placed are the centre of the canopy.



Gravity PARAGLIDERS

Paraglider: **Xduo** Prod. Dat.: _____
 Gleitschirm: _____ Prod. Dat.: _____
 Conformity: _____ Date: _____
 Geprüft von: _____ Datum: _____
 Test Standard: **LTF 91 / 09 & EN 926-1:2006, 926-2:2013**
 Prüfrichtlinie: _____
 Test Center: **EAPR GmbH, Marktstr. 11, D-87730 Bad Grönenbach**
 Prüfstelle: _____
 Serial No.: _____
 Werk-Nr.: _____

Test Reference-Nr.: _____
 Musterprüf-Nr.: _____
 Test Reference-Nr.: _____
 Musterprüf-Nr.: _____
 Class: **LTF / EN - B**
 Number of seats: **1**
 Anzahl Sitze: _____
 Takeoff Weight: **140 - 230 KG**
 Startgewicht: _____
 Takeoff Weight - Motor: _____
 Startgewicht Motor: _____
 Projected Area: **36,0 M²**
 Projektionsfläche: _____
 Number of risers: **4 + 1**
 Anzahl Traggurte: _____
 Accelerator only alpine flight: **NO / NEIN**
 Beschleuniger nur Bergflug: _____
 Trimmer only motor flight: **YES / JA** Weight: **8,4KG**
 Trimmer nur Motorflug: _____ Gewicht: _____
 max.way of acceleration: **60 MM**
 Beschleunigungsweg: _____
 Suitable for schooling: **-**
 Schulkunftsichtigkeit: _____
 Periodic inspection after: **150H 24 MON. / 150STD 24MON.**
 Regelmässig Nachprüfung nach: _____
 Towing: **Yes / JA**
 Windschlepp: _____

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 info@gravity-paragliders.eu

WARNING! Read and understand the owner's manual of this paraglider before operation.

Paragliding and Paramotoring is a hazardous activity that can and sometimes does result in severe injury or death. The designer, manufacturer, distributor, wholesaler, instructor and retailer cannot and will not guarantee your safety when using this equipment nor accept responsibility for any damage, injury or death as a result of the use of this equipment. This equipment should only be used by qualified and competent pilots or by pilots under the direct supervision of a competent and qualified instructor. You alone must take full responsibility to ensure that you understand the correct and safe use of this equipment, to use it only for the purpose for which it is designed, and to practice all proper safety procedures before and during use. Paragliding and Paramotoring require careful and constant care. Over time, solar radiation, dirt, dust, grease, water, wind, stress, and other wear will degrade the materials, performance, and safety of the equipment, there by increasing the risk of injury or death. Always wear a helmet and protective equipment when flying paragliders and paramotors.

Test-torn by / Eingelogen von : _____ Repairs / Reparaturen: _____ Date / Datum: _____
 Periodic inspection / Nachprüfung: _____

gravity-paragliders.eu

Illustration 04_ Signboard

2 POSSIBLE USE_

2.1 Motorised operations

The flight behaviour of the Xduo with motor is quite identical to that described in the Xduo manual chapter “The Flight”. Due to the higher wing and surface loading in the extended engine weight range, the according reactions are responding more dynamically. Opening the trimmer reduces the angle of attack and also causes a higher speed and thus more dynamic behaviour. It is recommended to keep the trimmers closed when flying through turbulent air. In order to keep the take-off distance and take-off speed low, the trimmers remain closed during take-off, especially when there is little wind. Although the Xduo has outstanding take-off properties, attention must be paid that due to the extended engine weight range the take-off and landing speed changes and alters noticeably.

2.2 E-climbing assistance/ E-ascent aid

Due to its unproblematic handling and high trim speed, the GRAVITY Xduo is ideally suited for the e-ascent aid.

2.3 Towing winches

The Xduo has no specifics when it comes to winching. But here a few tips that we urge every pilot to take into consideration. If you are not operating at your usual winch, get acquainted with the local procedures. Every visitor on unfamiliar flying grounds needs to get a good briefing by a local pilot. At the start take special care that the glider is completely over the pilot's head before the start commando is given. Eventual corrections to the direction with the brakes should not be applied before the canopy is over the pilot, otherwise the glider could fall back through too intense braking or the glider is towed away in non-flight-ready condition. The start commando must not be given before the glider is under absolute control. Strong direction correction during the start phase and before reaching the safety height are to be avoided. Attention also needs to be paid to the fact that a shallow angle is kept until reaching safety height. Do not use a tow line tension over 150 kp with the Xduo.

- Never tow the GRAVITY Xduo with a load exceeding the approved weight limits
- All persons and facilities involved in winch operation must have the required qualifications or approvals for towing paragliders on the winch. This applies to the pilot, winch operator, towing device, towing pawl and all other devices for which a certificate of competence is required

3 THE DEFAULT SETTINGS_

Base- and brake-line adjustment The factory, default brake-line setting corresponds to O-leeway plus 5 cm. It is recommended to adjust your brake line travel after the first flight to your personal preferences. Be aware not to adjust the brakes too short, otherwise the glider may fly with a little, but continuous applied brake pressure. This could be extremely dangerous during take-off, flight and landing! The afore mentioned factory brake setting allows for ample brake travel in extreme flight situations as well as for landing. At the same time it enables during flight at trim-speed a position of comfort for the pilots arms. In no case the setup A, B and C main lines should be changed before the wing has been flown in the original setup. Please also note that adjusting the height of the suspension to the hang points on the harness, changes the relative braking travel. When setting the adjustment, it is to be made certain that both sides are symmetrical and that a permanent knot is used. The bowline works particularly well because of the fact that it weakens the lines the least with excellent slip resistance.

 **PAY ATTENTION_**

Please note that the relative braking distance changes with the height/ length of the harness. When fixing the setting, make sure that both sides are symmetrical and that a permanent knot is used. The double fisherman's knot/ spar or pile stitch has proven particularly effective in that since it weakens the lines the least with excellent slip resistance.

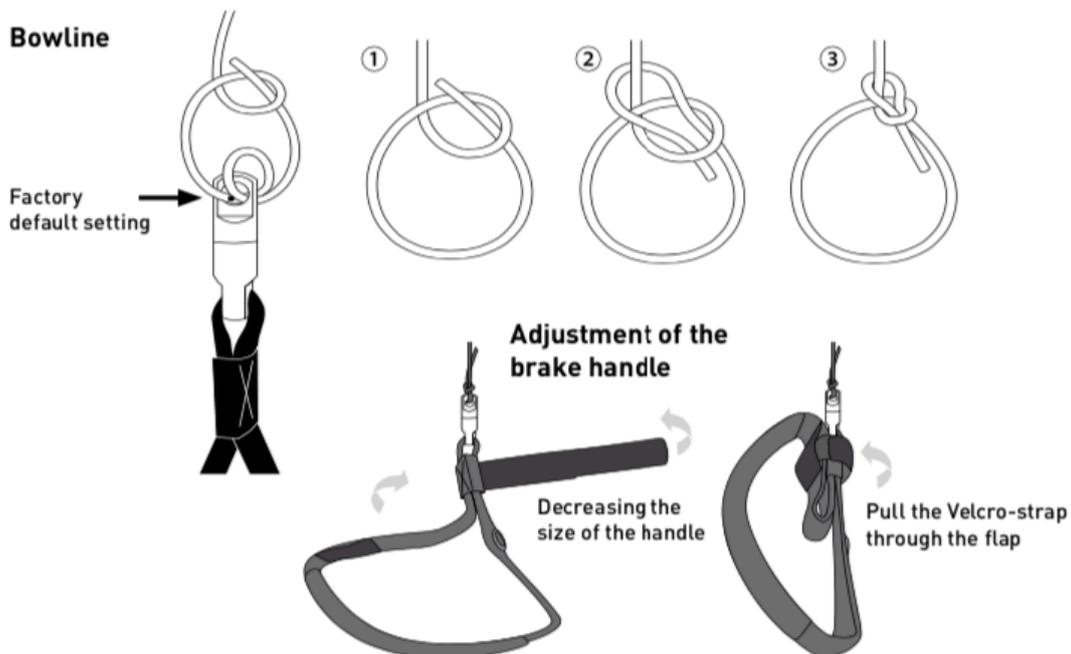


Illustration 05_ bowline/ double fisherman's knot

4 SECURITY PRECAUTIONS_

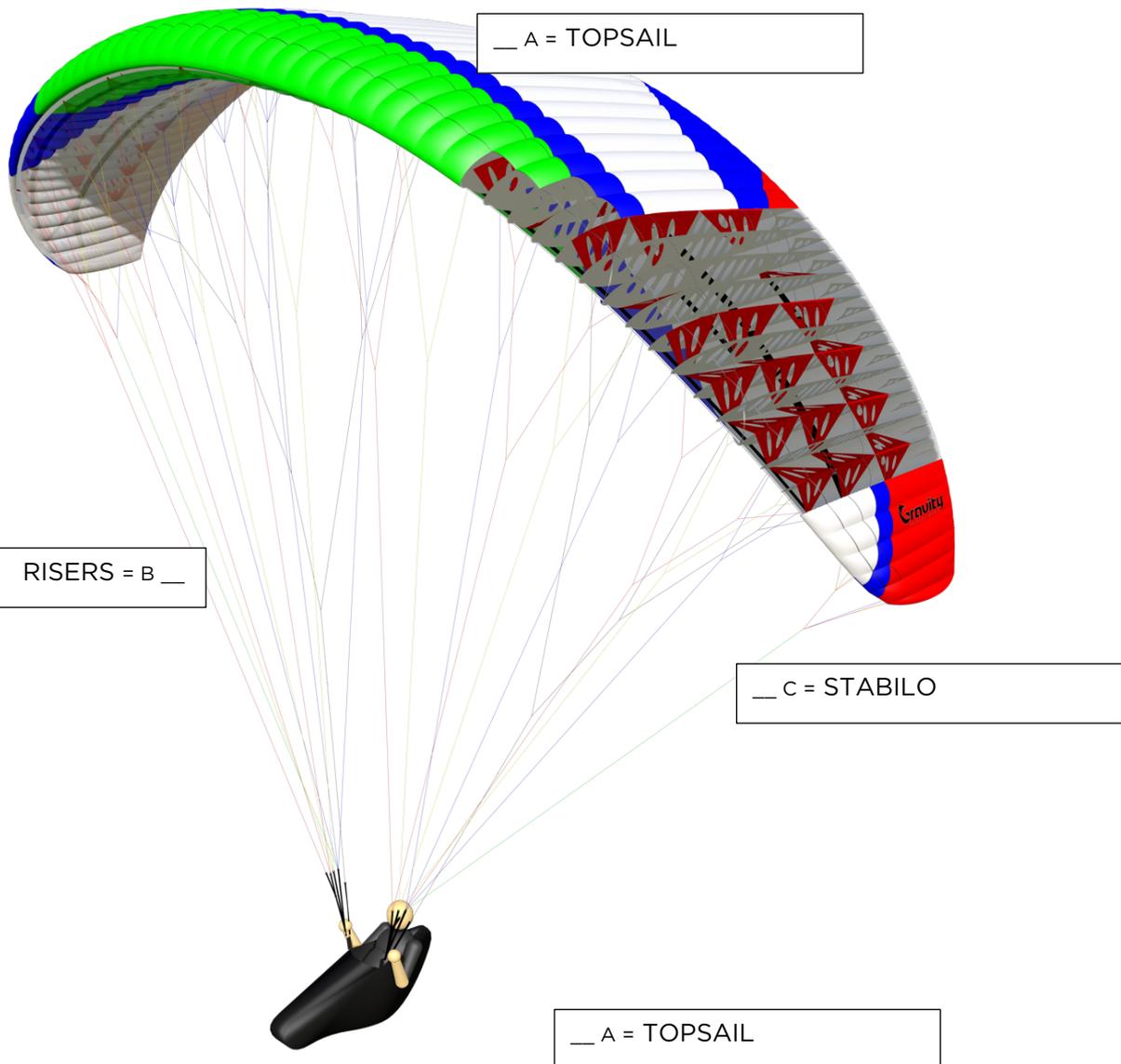
1. 1. Before the first flight, the cap, lines, all connections and sewing, the shackles, brake lines and brake line knots as well as any twisted lines must be checked by appropriately trained personnel and confirmed on the type plate
2. Make your first flight in a known flight area/ territory and in calm conditions
3. Test your GRAVITY Xduo only over water
4. During a "dynamic flight" the gravitation does not only affect you, but also on the glider. Do not underestimate this state and the forces!
5. Always fly your GRAVITY Xduo with at least one rescue device!
6. Compliance with the air traffic act and regulations are applicable in the respective country must be observed and revised carefully
7. Successful, certified completion of the appropriate training and license as well as the current existence of the appropriate level of knowledge / the current flight experience are prerequisites for using the GRAVITY Xduo
8. The use of suitable, tested and approved accessories (helmet, harness, rescue device) is a prerequisite for using the GRAVITY Xduo
9. Carry out a thorough material check of your equipment (top sail, bottom sail, ribs, especially the lines, carabiners, belt buckles, cloth, speed system, etc.) before every start
10. A flight with a crack or hole in the wing or line can be life-threatening
11. Always make sure that the aircraft is in a proper flying condition and that the required inspections have been carried out regularly
12. Be aware that as a pilot you must be physically and mentally able to carry out the flight unimpeded. You have to concentrate fully on flying in order to possibly avoid unpleasant flight conditions
13. Most accidents are due to pilot errors
14. Never fly near high-voltage lines, airports or highways, over people or during a thunderstorm! Otherwise you could endanger the life and physical integrity of third parties and / or your own and act grossly negligent at the same time!
15. The minimum distance must never be less than 50 m. At airports, this is a radius of 5 km
16. Find out about the prevailing weather conditions in the weather report and on site in advance
17. Only use the GRAVITY Xduo at wind speeds where you are able to control the glider 100%
18. Never use the screen during approaching thunderstorms or storms or when there is a high probability of thunderstorms or storms
19. Land immediately when thunderstorms or bad weathers approach!
20. Aerobic flying is generally prohibited and life-threatening. Unpredictable flight situations can occur that may get out of control. There is a risk of physical and thermal overload on the material and/ or the pilot



PAY ATTENTION_ Failure to disregard one or more safety precautions or violation can turn flight fun into a life-threatening event.

5 DEVICE DESCRIPTION_

5.1 Short description



- A - Top Sail
- B - Risers
- C - Stabilo
- D - Riserbelt

Illustration 06_ device description

5.2 Technical Data Xduo_

Specifications

Size	◆ 42 ◆
Start weight	140 - 230 kg
Flat surface	42,2 sqm
Projected surface	35,755 sqm
Flat wingspan	15,165 m
Projected wingspan	11,910 m
Flat AR	5,5
Projected AR	3,968
Chord: center/ wingtip	3,394 / 0,772 m
V-Trim	37 - 40 km/ h
V-Max	43 - 46 km/ h
Bridle height	9,086 m
Nr. of cells	52
Glider weight	7,4 kg
Bridle length	459,085 m
Line diameter	0,9 / 1,1 / 1,3 / 1,5 / 1,8 / 2,2 mm
Speed system / trimmer	No / Yes
Certified standards and procedures	LTF 91/09 & EN 926-1:2006, 926-2:2013
Folding lines used for certification	No

Illustration 05_ technological table

5.3 Innovations on our Product_

The constant search for innovative technical and throughout high-performance solutions, always serves a higher safety standard in paragliding. Here is an overview of our most important innovations.



3D shape - providing specific tension control of the wing and therefore optimized ballooning and wrinkle free outline



brake gathering system - this system allows the trailing edge on a calculated shorter situation for positive influences the brake characteristic



miniribs - optimizing the wing profile alongside the trailing edge



brake gathering system - this system allows the trailing edge on a calculated shorter situation for positive influences the brake characteristic



high definition profile - plastic rods are working in the upper-side of profile and covering 45 to 80% on the cord



high pressure crossport design - provides an ideal cross aeration of the crossports and helps you to balance the pressure differences on the inside of the wing on extreme flight situations/ conditions

5.4 Colours and Design_

“Never change a winning horse!”

One of the unique selling points of the GRAVITY product range is that each glider product is only available in a single lead design and comes without colour variations or special designs. That way we can maintain supply capability within the agreed lead times and can guarantee the price stability. We are aiming at keeping basic calculations stable for sales and as well as within the production processes with forecasted quantities. We have made a big effort at creating each product of the glider product range holistically and to give each product unique features and moreover high recognition values.

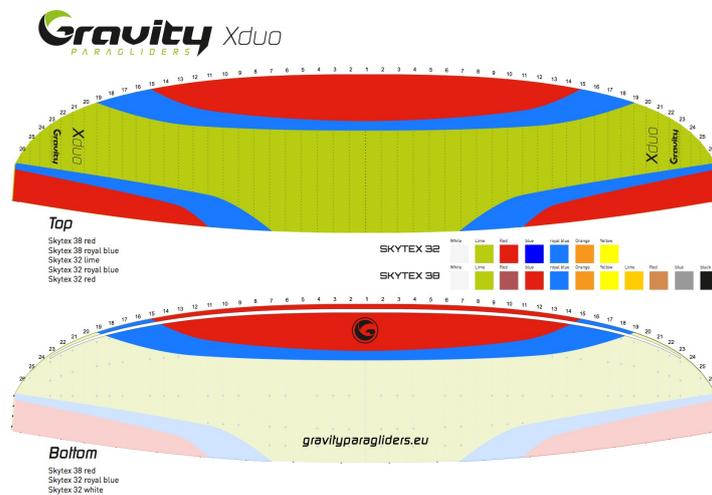


Illustration 08_ colour catalogue rendering



Illustration 09_ colour X duo

5.5 Risers

The A- and B-risers have different colours and are equipped with the Pilot Assistant System to ensure positive identification at take-off and during the flight with big ears. The D-riser is equipped with the EAR-FIX-CLIP. The clamping device is elegantly covered with neoprene and allows the pilot to fix the outer part of the split A lines at any desired position.

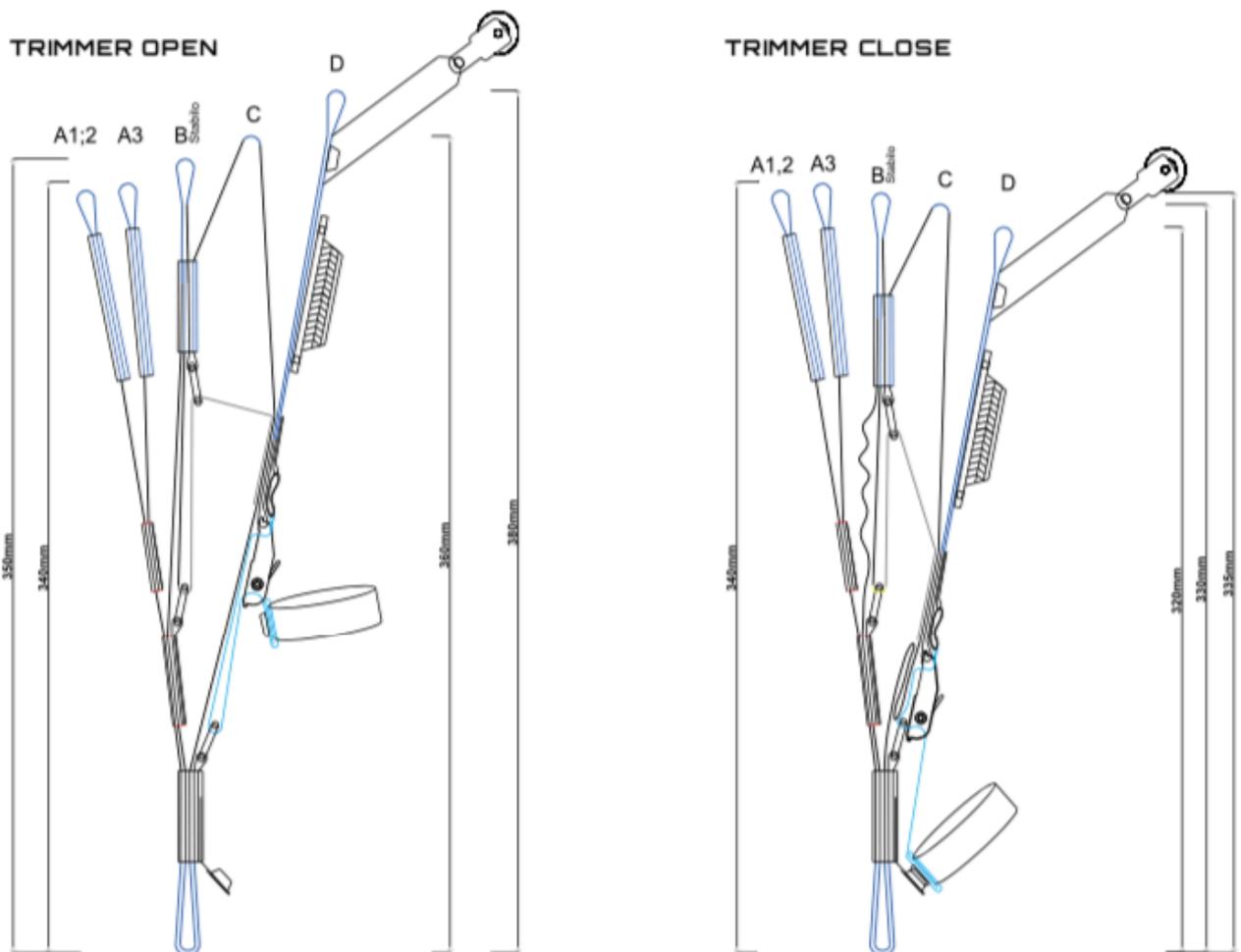


Illustration 10_ riserbelt



Illustration 11_ riserbelt

5.5 TRIMMER

Xduo 2 is equipped with an innovative trimmer system. The effective system avoids the twisting of the profile through not only accelerating D and C level but also the B level is adjusted in relation to the angle of attack. Thereby the form of the profile stays intact which ensures clearly better gliding. GRAVITY recommends to keep the trimmer closed during take-off and landing. All extreme flight attitudes (e.g. collapses) are occurring more dynamically at higher speed. Further, the Xduo is equipped with the changeable trimmer band. That is easily changed through a carabiner that is covered with neoprene. Other adjustable, removable or variable mechanisms are not available.

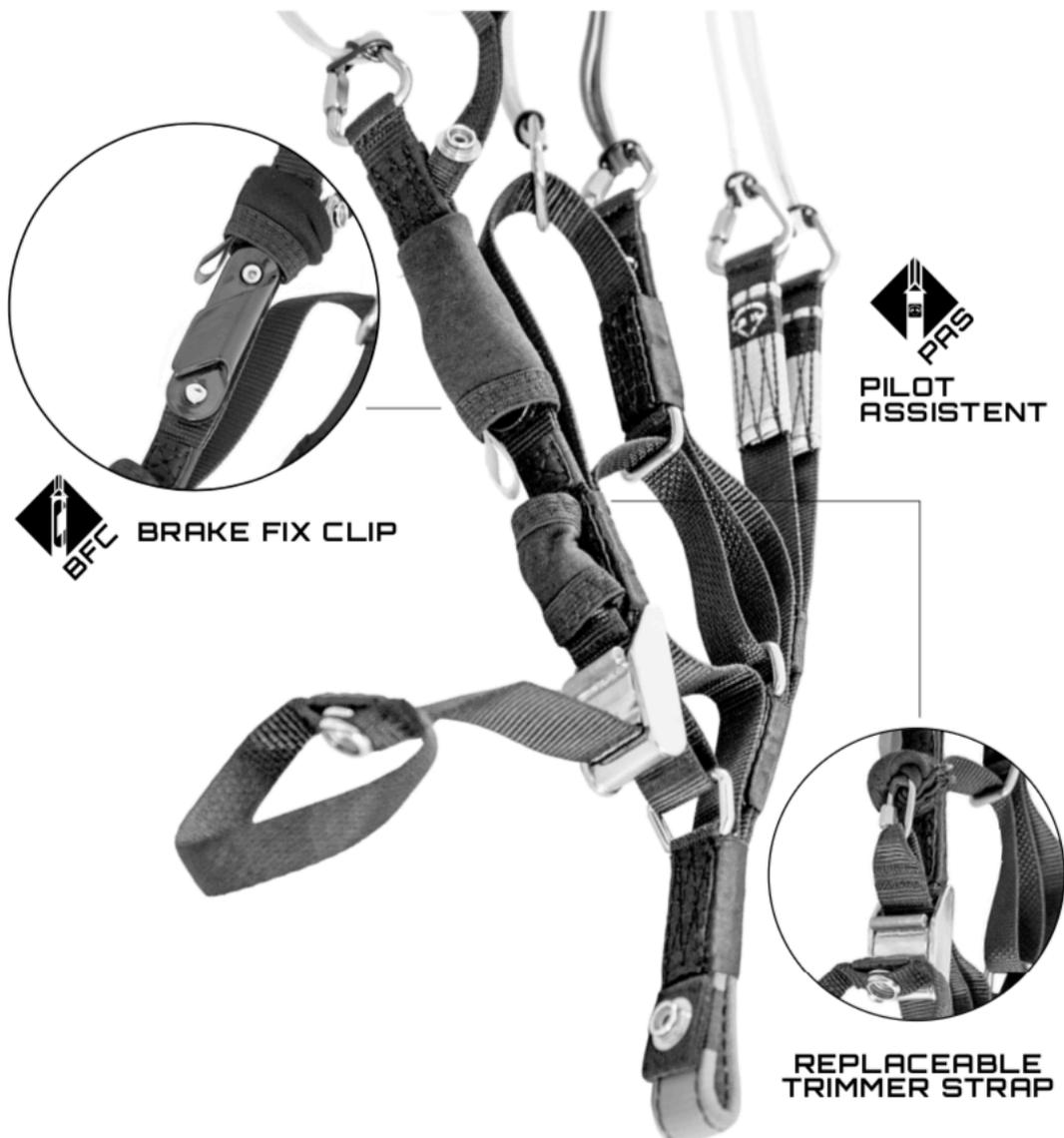


Illustration 11_ trimmer tandemglider

5.6 Spreader bar

The Xduo comes with a hard spreader bar. However, soft spreaders may also be used. The double-seat distance suspension has a suspension loop for the pilot (A) two suspension loops for the passenger (B + C) and the centre glider suspension (D). The pilot always hangs himself in loop A. For smaller passengers, use loop C and loop B is for heavier passengers. It is essential to ensure that it is suspended symmetrically. The unbalanced suspension can cause the pilot and passenger to be in an uncomfortable flight position and also makes it difficult to control the glider.



Illustration 12_ trimmer spreaderbar

6 GENERAL INFORMATION FOR TANDEM FLIGHTS_

6.1 Dealing with the passenger

The launch site should be chosen away from the hustle and bustle, with a first look at the approach rout. It is recommended to carry out warm-up exercises with the passenger before the start and to start the take-off run in succession or side by side, depending on the equipment. It is particularly important to point out to the passenger that the start consists of two phases: the winding-up phase and the acceleration phase.

Practical experience has shown that many passengers sit in the harness too early due to the slowing down of the take-off run by the paraglider and thus cause a faulty start. It has proved to be useful to explain that it is first necessary to mount the paraglider with slow steps (in order to have correction options) but that, like any other aircraft, it has to be brought up to speed in order to be able to take off.

Exception: In strong headwinds, the passenger and the pilot must always brace themselves in the wind-up phase (preferably by grasping the T-bar), so as not to be knocked over.

6.2 Equipment

The clothing of the passenger should be adapted to the temperatures and necessarily include ankle-high shoes with a non-slip sole and a helmet. Gloves are also recommended. Although full-face helmets offer better protection, they should be equipped with a removable or wide chin-guard because of the possible risk of vomiting (panic). Please remember to inform the passenger early, not just on the mountain, about the necessary equipment.

6.3 Airfield

When choosing the starting position, pay particular attention to the requirements of the tandem glider, i.e. a possibly longer start-up phase and a limited correction possibility must be considered. In addition, attention must be paid to the absolute obstacle clearance of the run-up route. Due to the generally higher speed of double seats, a longer sliding distance should be taken into account when choosing the landing site, as well as the limited manoeuvrability near the ground. The landing field should be generously sized and the landing site can be obstacle and turbulence free.

6.4 Briefing of the passenger

For the start run the following commands are agreed:
Pulling up (better: 3-2-1 go)

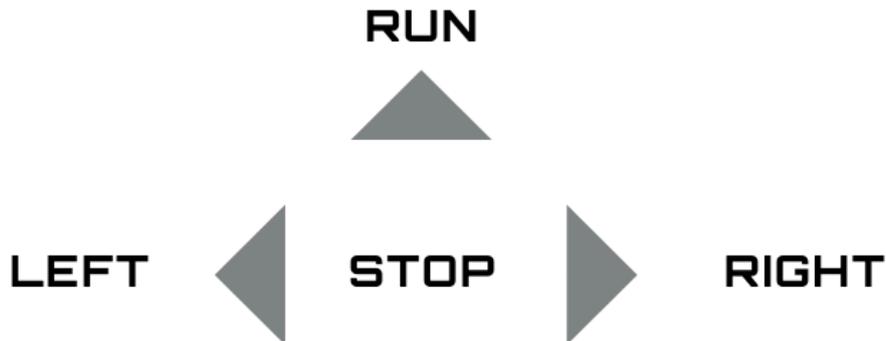


Illustration 13_ running position take-off

For the command “run” the passenger has to bring speed to the paraglider. In case of an aborted launch the pilot immediately calls out “stop”. Corrections are made by specifying the course of the run that’s to be changed. The direction of a possible start abort is to be determined before the start! The pilot should especially bear in mind that the higher wing loading requires a longer start-up distance and a higher air speed than in single-seat aircraft operation. The further flight phase is also to be discussed with the passenger before the start. It is important that the start of a refusal by the passenger may under no circumstances be enforced.

It has also proved helpful to warn the passenger not to look down, but rather focus attention on other aspects of the flight in order to avoid any emerging fear of heights. Also in this phase the pilot actively engages the passenger in all activities, although only the pilot is responsible for the proper execution. After laying out and sorting the lines the pilot helps the passenger to put on the harness. It is recommended to do a seat test, most simply with the help of another pilot who lifts the passenger off the ground in his harness on the carabiners. Thus the seat position can be checked in flight and any necessary correction can still be made. Crucial importance is the control of the leg loops and the chest strap! Harnesses with an airbag or protector have proven to be effective, as many passengers do not run when landing, but tend to sit down in the grass.

6.5 *Flight Check*

A careful pre-check is required for each aircraft, including Xduo. Our experience has shown that tandem paragliders are often used by several people. Please double check if you are not the only pilot using this paraglider. If you are lending your glider, please inform the borrower as well. Also ensure that the borrower knows the operating limits of Xduo and has the required certificate of competence. Before each start, check the lines, straps and glider canopy for damage. Even with small defects you should definitely not start. After the paraglider has been unpacked and designed to be semi-circular, note the following:

The paraglider should be laid out so that when pulling the A-risers the lines in the middle of the glider are tense a little bit earlier than those at the wing tips. This ensures a light and directional start. When laying out, please always pay attention to the wind direction, so that both halves of the paraglider are loaded symmetrically when mounting against the wind. The line groups should be carefully separated and the risers arranged. Special attention should be paid to the A-lines. They must run freely and without entanglement from the A-riser to the canopy. Equally important is that the brake lines are completely unobstructed and cannot get stuck anywhere when starting. If the risers are not twisted, the brake lines run freely through the eyelet to the trailing edge of the screen. Make sure there are no lines under the canopy. A line-over can have fatal consequences at the take-off. It is highly recommended to include the passenger in the pre-check to familiarise them with the aircraft accordingly.

6.6 **Hang Point Check**

The decision as to whether the passenger should be suspended in a longer or shorter loop of the T-bar (if available) must be made by taking into account the height of the person and any weight difference that may be present. If the passenger is smaller than the pilot, he is to be hung in the lower suspension loop. This prevents the passenger from being raised too early from the ground and also the view for the pilot is kept free. After attaching the pilot in the T-bar with straps and screwing the carabiners, he asks the passenger to stand in front of him to hook him correctly. He is asked to visually follow the process. Do not forget: the passenger's carabiners are also to be screwed together (except Twistlock). The passenger is in front of or along-side the pilot during all flight phases. Suspensions which allow a position of the passenger behind the pilot are not permitted for reasons of safety!

6.7 Pilot/ Passenger Configuration

There are two ways of starting: one behind the other (passenger in front) or side by side.

6.8 Behind Each Other

For the method of starting in succession, it says that the passenger does not swing forward after the start and can be pushed in right direction during the acceleration phase. In addition, it can be prevented that the passenger sits down in the harness too quickly by an additional impulse with the knee.

6.9 Juxtaposition

The advantage of starting next to each other is better possibility for running and freedom of movement. Even with a reverse start, this technique offers certain advantages. Often a disadvantage that is mentioned is that the passenger swings in the starting direction after the start. By holding onto the passenger at the chest belt or the cross bracing of the pilot, however, this can be prevented and a synchronicity in the running direction can be achieved. This starting position is more problematic in strong winds as the passenger is less able to brace himself against the wind. So he cannot exert pressure to the front and take almost no influence on the paraglider during the mounting process. In such a case, therefore, a reverse start or help in take-off by two well-versed pilots can be the better choice. At the behind-each-other starting method the passenger best holds onto the loop of the T-bar i.e. short above the carabiners. At the Juxtaposition starting method he grabs the pelvis or chest belt of the pilot.



PAY ATTENTION_ Immediately before take-off, the pilot must again check both harnesses, carabiners, suspension (T-bar), lines - including the brakes, and the correct position of the paraglider (5-point-check).

6.10 Inflating the Paraglider

The paraglider is inflated by the pilot as described in the chapter “Flight Practice / The Start”. This process can be facilitated in particular with the starting method “one behind the other” in that the passenger grabs the T-bar above the carabiners and thus helps to pull the glider up. This has the further advantage that the passenger has something in his hand and is actively involved in the starting process. It is important for the pilot to carefully check whether the glider is filled correctly or if it has to be aborted. In case of problems an immediate abort occurs, otherwise now - with properly filled canopy and untwisted lines - the decision to start with the command “run” to the passenger occurs. After the command “run” a fast acceleration takes place up to the lifting point. If the passenger runs too timid, the command “run” should be repeated aloud and the passenger may be encouraged to accelerate by pressure from the pilot.

Flight After the start, the passenger is asked to look up to see the open carrying wing. This creates confidence in the aircraft (and calms the nerves). It is also important to ask the passenger whether he sits comfortably in the harness and not just on the front edge of the seat board. If the knees of the passenger are clearly hanging down, he has not yet the right seating position, but if the knees point up, the pilot can see that his passenger already slipped into the harness as it's supposed to be. If necessary, the pilot helps the passenger, after sufficient ground clearance, to slip properly into the harness. Only then does he adjust his harness himself, so that not too much unrest arises. Always keep in mind that a tandem paraglider has a larger turning radius and reacts slower than your solo paraglider. But also with the tandem paraglider the handling can be decisively improved by shifting your weight. Overfilled thermal hoses are taboo for the tandem! The sitting position behind each other cause that you cannot look the passenger in the eye. Therefore, it is important to exchange words of encouragement and excitement during the flight, in order to counteract any emerging fear of heights or even just a feeling of discomfort, or to recognize this in the beginning.

A good advice in such a case is to look at the horizon and not look down. In general, the more relaxed the pilot is towards the passenger, and the calmer he radiates, the more confidence the passenger will gain and enjoy the flight all the more

Landing The preparation of the passenger on the landing should be done only in flight. Due too much information before the start, the passenger is just unnecessarily overwhelmed. Especially on longer flights, it is recommended to stimulate the blood circulation of the legs of the pilot and passenger by movement before landing. At sufficient altitude and before you reach the position, check the wind direction at the landing side, altitude and air traffic. Especially for double-seat-ed flights, this is of crucial importance because of the generally slightly higher approach speed and reduced mobility. A backwind landing for two carries a high risk of injury! The landing area should be dimensioned large-scale. Corrections near the ground are to be avoided because of the pendulum tendency. The landing should be done side by side in every case, since experience has shown that many passengers - despite the request to do so - don't run but sit down instead.

It would be possible that the pilot bounces his chin on the helmet of the passenger and thereby bangs his teeth or at least very much bites his tongue, or even falls over the passenger and injured him. Also make sure that the passenger does not rest his hands on the ground when landing because of the risk of injury. It has proved useful, to push the passenger to the side with one leg and ask him to slide out of the harness and into body verticality on command before landing in the stabilised approach. Then take a step to make it easier to run out! The position of the passenger has to be checked by the pilot! Perform the final approach in the medium to high speed range to have sufficient residual buoyancy for a fall-free landing even in calm conditions. The steering lines should be pulled through at a uniform speed. It is optimal, if pilot and passenger touch down with minimal travel.

After the Flight After the flight, the passenger should be given the opportunity to describe his/ her experiences and feelings or to ask questions, because right then, there is often the need to share the experience and what was encountered.

7 TRANSPORTATION and STORAGE_

When transporting the paraglider, make sure that it is not exposed to any kind of liquid. It must be packed dry. When storing the Xduo it should be ensured that it is not exposed to UV rays. In addition, it must not be stored together with acids or the like or anywhere near them. Dry storage is extremely important.



PAY ATTENTION_ After a long storage period, the glider must be checked thoroughly.

8 THE FLIGHT_

8.1 Start/ Take-Off

Hold A-risers and brake handles in your hands. A final check on the laid-out glider is obligatory. The middle of the glider of the Xduo can be seen by coloured differentiation of the middle flares. Careful laying-out of the canopy according to the wind direction and a run-in line of the centre of the glider facilitates a smooth start substantially.



PAY ATTENTION_ When the wind exceeds at 5 km / h from the front, the centre A-risers are sufficient for mounting the glider. With less or no wind use both A-risers!

The glider is filled with a consistent, even draft. The arms are to be stretched, in extension of the A-lines. As soon as the inflation slows down - the canopy is above the pilot at this point - the pilot looks up and verifies that the glider is fully opened above him. The Xduo has no overshoot tendency, so that braking in this starting phase is normally not necessary. Any directional corrections with the brakes should only be made once the glider is already above the pilot, as the glider may fall back due to excessive braking. The final decision to start is only now. After a few quick steps, you take off and release the brakes to accelerate.

8.2 Turning

The Xduo is extremely agile and responds to control impulses directly and without delay. By shifting your weight, it is very easy to take turns with minimal loss of height. A combined steering technique, weight shifting and pull of the inner curve brake line, is ideal in every situation, to turn, although the radius of turn is determined by the amount of well-dosed pulling of the brake lines. If you manage to include your passenger in the control of the Xduo,

you can increase manoeuvrability by shifting the weight of the pilot and passenger. This allows a fatigue-free flying. If it is necessary to turn the Xduo slowly in a confined space, it is recommended to control the pre-braked paraglider by loosening the outside and well-dosed further pulling of the inside brake line (opposite movement of the brake lines). From about 75% of one-sided brake line pulling, the Xduo has a significant lateral inclination and a fast and steep curve, which can be extended to the spiral. The spiral has to be slow in and out. The inclined position is controlled by careful pulling / slackening of the inner curve brake line. The minimum symmetrical control travel is more than 65cm.



PAY ATTENTION_ If you pull a brake line through too abruptly, the glider can do a negative turn!

8.3 thermal / turbulence

The Xduo shows its strengths especially when flying in the thermals, in the house thermal as well as on long journeys. In turbulent air, the Xduo should be operated with a light brake pull. By increasing the angle of attack, the stability of the canopy is advantaged. When entering strong thermals or with broken thermals, make sure that the paraglider canopy does not lag behind the pilot and enter a dynamic stall. This is prevented by giving in to the upwind region of the thermal something to speed up. Conversely, the paraglider must be braked when the support surface comes in front of the pilot by entering into a downwind area or out of the thermals. To fly faster is useful for traversing downwind zones. Due to its design, the Xduo has a very high stability. An active flight style in turbulent air, as described above, however, additionally contributes to further safety. Folding and deforming the canopy can be largely prevented by active flying style.

8.4 Landing

The Xduo can be landed very easily and precisely. In the end up into the wind, let the Xduo glide out with normal flight and then pull the brakes determined and fast when you're about 2 m above the ground. In strong head winds slow down the brake pull accordingly. Landings from banked turns and fast turns before landing are to be avoided because of the associated pendulum movements.



PAY ATTENTION_ In case of strong wind starts, ground handling and landing the canopy can hit the ground at very high speed. This should be avoided, since otherwise cracks, damage to the seams or the cloth may occur.

8.5 Extreme Flight Manoeuvres

Although the Xduo has a very high level of aerodynamic stability, turbulence or pilot errors can cause the Xduo to reach an extreme flight situation. The most established method of

being able to react calmly and correctly in such a case is to attend a safety training course (SIV) where, under professional guidance, one learns to master extreme flight situations. Extreme manoeuvres should only be carried out in calm air and at a sufficient altitude and only during safety training under professional guidance and equipped with a rescue parachute. At this point the existing obligation to only fly equipped with a reserve parachute. The extreme flight patterns and flight situations that are described in this chapter can either be intentional, caused by turbulence or pilot error. Any pilot who is in turbulence or makes a mistake in the control of his paraglider, can get into these flight situations. All of the extreme flight patterns and flight conditions described here are dangerous if performed without adequate knowledge, at a low safety level, and without the appropriate instruction. The incorrect execution of the flight patterns and flight conditions described here can be life-threatening. Under no circumstances may extreme manoeuvres be intentionally brought on with a passenger.

8.6 Wingover

To fly a wingover, the pilot flies alternating turns with increasing curve slope until the desired slope is reached. Collapsing normally only occurs with the Xduo at a very high curve slope.



PAY ATTENTION_ An inclination of more than 60 degrees is considered aerobatics.

8.7 Frontal Collapse

A negative angle of attack - caused by turbulence or the reversing of the A-risers on both sides, causes a frontal collapse of the leading edge. The Xduo usually terminates a front collapse quickly and independently. Uniform symmetrical braking on both sides can assist reopening.

8.8 Deep stall

The GRAVITY Xduo is not stall sensitive. If in a stall, caused by over-pulling on the brakes, the rear risers or a delayed B-stall exit, the release of the brakes or the rear risers, recovers the stall. Should the stall be caused by an extreme flight condition or configuration (i.e. take-off weight to low), a symmetric forward push on the A-riser or opening the trimmers recovers the stall. Flight exercises that intentionally approach the stall should only be performed with sufficient safety height. In no case the glider should be braked one-sidedly if one believes to be in deep stall. The canopy could turn negative!

8.9 Full Stall



PAY ATTENTION_ The forces that occur on a tandem paraglider of this size during the execution of a full stall are enormously high! To start a full stall, both brakes are fully pulled through. Depending on the length of the pilot's arm, it may be necessary to wrap the brake lines. The Xduo does not empty completely and therefore does not form a stall rosette. The effort required to keep the Xduo in the Full stall is very high. The canopy should be stabilized before exiting the full stall. To release, both brakes are released slowly and symmetrically without collapsing. With correct symmetrical discharge, the canopy shoots only moderately forward without folding. An asymmetrical collapse is to be avoided. The resulting dynamic forces and the reactions of the canopy during the discharge are very strong and the paraglider can fold.

8.10 Collapse

Although the Xduo has a very high aerodynamic stability, more turbulence can, as with all paragliders, cause the canopy to fold. This is usually not critical and self-reopening is quick and reliable. Reopening can be assisted by vigorously braking or pumping the affected side, while counter-steering on the open side. In case of large-scale collapse, the countermeasure has to be precise in order not to completely tear off the flow on the canopy and to get into the full stall.

9 Rapid descent

Should a fast descent be necessary due to special weather conditions such as thunderstorms, a weather front, extreme winds or other dangers and hazardous situations occur, the following options are available:



PAY ATTENTION_ Under no circumstances may the following manoeuvres be initiated without the passenger being prepared accordingly!

9.1 „Big Ears“

On both sides, the outer A-risers of the split A-riser are folded downwards (see note), causing the outer wings to fold. You keep the brake handles together with the folded outer A-risers in your hand. The glider remains fully controllable by one-sided braking and weight shifting and steers straight ahead with increased descent speed (3-4 m / sec, depending on the number of folded-in cells). If you let go of the outer A riser straps, the folded-in cells open with appropriate load by itself. Should this not be the case, the unfolding is to be initiated by gently braking.



PAY ATTENTION_ It is sufficient to fold the outer risers down to cover your ears. If the outer A-risers are pulled down over this area, the desired directional stability is no longer guaranteed by the too large folded-in area.

All descent aids should be practiced in calm air and in sufficient altitude to be able to use them effectively in extreme conditions!

9.2 B-Stall

On both sides, the red auxiliary loops attached to the B-belts are pulled down simultaneously and quickly. The brake handles are released, or passed to the passenger, if this is also a pilot. As a result, the flow on the proper side breaks down to a great extent and the glider goes into a bag-like flight without advancing forward. By further pulling the loops, the area can be reduced and increase the rate of descent. If the loops are loosened, the profile will regain its current, the paraglider will pick up speed and return to normal. The loops on the B-straps should be released evenly and quickly to finish. If the Xduo gets into the deep stall due to too slow skipping of the B-stall, which is not normally the case, see chapter ““Extreme flight manoeuvres””.

9.3 Emergency piloting/ control

If for some reason it is not possible to control the GRAVITY Xduo with the brake lines, it can also be controlled and landed very well with the back risers. Turns can be flown and added with a weight shift, but please pay attention that the glider does not lock in a spiral.

10 REPAIRS_

In general, repairs to paragliders may only be carried out by authorized service centres. Small damages such as cracks or small holes up to a size of 2 x 2 cm, which can be carried out without special equipment, may be carried out by the pilot him-/ herself. The supplied repair adhesive sail from the repair kit is to be used. Cracks or small holes are made from either side of the damaged area. Please note that the repair adhesive sail protrudes at least 2 cm above the damaged area on all sides. The adhesive sail can be cut to the appropriate shape. Rounding the corners prevents detachment and fraying.

11 MAINTENANCE and CLEANING_

Since only high-quality materials are used at GRAVITY, the GRAVITY Xduo will retain undiminished airworthiness for several years if it is properly cared for and maintained. How quickly your GRAVITY Xduo ages, ultimately depends on how often it is flown, where it is flown, how many UV-hours it accumulates and how carefully and regularly it is cared for. Below are some useful tips on care and maintenance:

- 1) Long-lasting UV-radiation and extreme acro-manoevres reduce the resistance of each paraglider cloth over time
- 2) Never expose your GRAVITY Xduo to unnecessary sunlight, but put it back in the glider bag after the flight
- 3) When choosing the take-off site, pay close attention to the surface on which the paraglider is laid out
- 4) Stacking the opening reinforcements properly increases the life-span of the paraglider
- 5) Don't drag your paraglider over the ground and pack it on grass
- 6) Please pay attention to the following:
 - a) the lines are checked regularly for damage
 - b) the lines are not nodded unnecessarily and you do not step on the lines when laying them out
 - c) check the strength and correct length of lines after overloading (tree landings, water landings, etc.) and have them replaced if necessary
 - d) when noticing changes in flight behaviour, all lines lengths must be checked.
 - e) the brake stem line on the brake handle must not be knotted unnecessarily, every knot weakens the line

The best way to clean the cap is to use warm, clean water and a soft sponge. Under no circumstances should chemicals be used for cleaning, as these damage the coating and the strength of the cloth. Always store your paraglider dry and protected from light, never near chemicals. After 24 months or 150 operating hours at the latest, the GRAVITY Xduo must be brought to the manufacturer or GRAVITY Competence Centre for inspection. On request, we would be happy to carry out the required inspection before, if you believe that it is necessary.

11.1 Packing

look for a clean - best case also soft - underlay to spread out your glider. free the cloth of soiling like leaves, grass or sand and sort the lines evenly. Use the riser-fix system at the rear end of the wing for the risers. make sure that the glider is dry and clean before you pack it up. Now start to fold the glider from the middle out cell by cell. after that place both halves on top of each other and fold the glider to the end format. Shifted packing prevents constant abrasion of the middle of the paraglider.

11.2 Recycle

GRAVITY uses only safe materials and puts a lot of value into saving resources as well as using non-detrimental materials. Nevertheless, the materials used in a paraglider need proper disposal. Please return worn out gliders to GRAVITY airsports & more GmbH or disassemble the glider into its parts and recycle them accordingly.

12 FLYING ACCESSORIES_

12.1 Xfusion _ guard, performance and quality - in a petite pack

GRAVITY presents a ground-breaking, innovative series of reserve parachutes in the latest format. The very light cross canopy X was designed and built, combining premium materials and the ultramodern technical enhancements, providing all constructional advantages of the square reserve parachute with a sensational weight of only 0.98 / 1.2 kg. The Xfusion not only impresses with its little pack-weight but also with precise and quick responsiveness when it comes to opening and sinking rates. Using delicate scaling and research, the cross-canopy shape as well as the air outlets making its flight behaviour practically free of pendulum movements. This series was produced to ensure safety, using highest quality standards in materials and production - designed to last and to keep you safe from beginner, ambitious, long distance to pleasure and fun-loving pilots.

Specifications

	✦ X100	✦ X115	✦ X130	✦ X150	✦ X220	✦
Weight	0,98 kg	1,20 kg	1,44 kg	1,68 kg	2,27 kg	
Surface	28,5 sqm	36,2 sqm	40,2 sqm	45,2 sqm	64,7 sqm	
Maximum payload (sink test)	100 kg	115 kg	130 kg	150 kg	220 kg	
Maximum payload (load test)	100 kg	115 kg	140 kg	160 kg	220 kg	
Sink Rate on maxload	5,6 m/ s	5,35 m/ s	5,1 m/ s	5,1 m/ s	5,3 m/ s	
Packing Volume	2380 cm3	3850 cm3	4180 cm3	4350 cm3	8700 cm3	
Panel	12	20	28	28	28	
Number of lines	24	24	28	28	28	
Total length	5,80 m	6,20 m	6,50 m	6,90 m	7,10 m	
Certification No.	LTF	EN / LTF	EN / LTF	EN / LTF	EN / EÜ_222.2018	

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USPs

- high safety aspect without horizontal drift
- extremely fast opening time
- unmatched pendulum stability with low sink rates
- very simple packing method with a small packing size
- high-quality material mix with water-repellent material
- cap construction with optimized air outlets
- minimal weight without reducing the geometry
- 220 kg lightest EN certified cross cap on the market

Illustration 14_ Xfusion product range

13 PRESUMPTION OF RISK_

The use of the GRAVITY Xmaniac poses certain dangers of physical injury or death to the user of this product or third parties. By using the Xmaniac you agree to accept all known and unknown, probable and unlikely risks of any kind of injury. The dangers associated with practicing this sport can be reduced by internalising the warning and safety requirements and content stated in the manual and the care required in individual cases, as well as common sense. The risks inherent in this sport can be largely reduced if you follow both the maintenance guidelines listed in these instructions for use and common sense.

14 LIABILITY DISCLAIMER_

By concluding the purchase contract for a GRAVITY Xduo, you declare your consent to the following points within the legal requirements: THE DISCLAIMER OF ALL AND EVERYTHING CLAIMS arising from the use of the GRAVITY Xduo and either its components now or in the future against GRAVITY airsports & more GmbH and all other contractual partners could grow up.

The legal release of GRAVITY airsports & more GmbH and all other contractual partners from any claims regarding loss, damage, injury or expenditure that you, your closest relatives and relatives or any other user of your GRAVITY Xduo can suffer from the use of the GRAVITY Xduo result, including the liability resulting from law or contract on the part of GRAVITY airsports & more GmbH and all other contractual partners in the manufacture and processing of the GRAVITY Xduo and all of its components.

With the occurrence of death or occupational disability, all of the provisions of law listed here come into force and also bind the heirs, closest relatives and next of kin, estate and asset managers, legal successors and legal representatives. GRAVITY airsports & more GmbH and all other contractual partners have given no other oral or written representations and expressly deny that this has been done, with the exception of what is stated here in and in the GRAVITY Xduo manual.

15 SAFETY ADVICE and LIABILITY_

At the time of delivery, this paraglider complies with the approval regulations of the EAPR (see Appendix). Any unauthorized change will invalidate the operating license! Each pilot bears responsibility for his own safety and must also ensure that the aircraft with which he / she flies is checked for airworthiness before each take-off.

Further we assume that the pilot is in possession of the required valid qualification and that the applicable legal provisions are complied with. Use the device at your own risk! Manufacturers and dealers assume no liability for accidents of any kind and their consequential damage. Follow the safety precautions to fly safely.

16 LIABILITY EXEMPTION and WAIVER_

You hereby declare that - before using the GRAVITY Xduo - you have read and understood the entire manual of the GRAVITY Xduo, including all instructions and warnings contained in this manual. In addition, you declare that you ensure that - before you allow someone else to use your GRAVITY Xduo - that any other users (who will take over the product from you permanently or for a limited period of time) have read as well as understood the entire user manual of the GRAVITY Xduo including all instructions and the warnings contained in this manual.

GRAVITY airsports & more GmbH accepts no responsibility, liability and / or guarantee for checks, inspections and repairs not carried out by it.

A handwritten signature in black ink, consisting of a stylized 'S' and 'B' followed by a horizontal line.

Stefan Berger
owner & sales

17 MAINTENANCE MANUAL_

English Release.1.0; January 2020

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All technical information in this manual has been carefully checked by GRAVITY airsports & more GmbH. However, we would like to point out that no liability is accepted for any incorrectly specified technical information. This applies to legal responsibility and liability for consequences that are based on incorrect information. We reserve the right to make ongoing changes to this manual insofar as they serve technical progress.

17.1 Subject to inspection and inspection intervals

Regular inspection according to the aircraft inspection regulations for certified paragliders. For end consumer devices after 24 months, for school devices after 12 months.

The inspection must be carried out according to the intervals specified above or at the latest after 150 flight hours. Ground handling should be included in the number of flight hours.



PAY ATTENTION_ in the event of abnormal flight behaviour, the manufacturer should be informed immediately and the glider sent in for checking if necessary.

17.2 Who is authorized to check?

In addition to the manufacturer or the person/ test centre commissioned by him, only the owner of the paraglider may personally carry out the two-year test, given he meets the requirements.

17.3 Rescue inspection equipment

Before the rescue system is packed, it must be checked by the packer. If the parachute has been opened for rescue, it must be checked.

If a rescue parachute is to be repacked, a trigger check must be carried out. It must be determined whether the release force is between a minimum of 3 and a maximum of 6 kg. Checking from the top and bottom sail, seams, all lines to the rescue system.

17.4 Holes and cracks

The upper and lower sails for paragliders and rescue systems must be checked panel for panel/ length of material from the leading edge to the sail's trailing edge. Should

abnormalities reveal themselves while testing, the glider needs to be presented to the manufacturer for professional testing.

- 1.) Check for holes, small or large cracks, strains and chafe marks
- 2.) Defects on the coating, other abnormalities on the cap such as old repairs
- 3.) For rescue equipment, a light table must be used to check holes, chafing points and expansions

17.5 Abrasion and expansions

In the case of large and critical chafing, straining and stretching, the affected sailing tracks must be replaced by the manufacturer.

The determined values/ changes are to be noted in the inspection report!
Checking the ribs:

- 1) Visual inspection of the chambers (from the entry to the rear edge) to see whether the inner seams, cell partition walls and stiffeners are in good condition, i.e. without cracks, stretching, straining, chafing, damage to the coating
- 2) If the ribs are torn, the sewing/ stitching is defective, loose or missing, the glider must be sent to the manufacturer or an authorised dealership or competence centre
- 3) The specified values / changes are to be noted in the inspection report!

17.6 Tear resistance control

To be carried out with the bed meter at the following points (B.M.A.A. approved patent number GB2270768 Clive Betts Sails). The test sequence can be found in the operating instructions for the bettsometer.

- 1) Punch a needle-thick hole in the upper and lower sails of the A-line linkage and check the tear resistance
- 2) The limit value of the measurement is set to 500 g, and a crack length of less than 5 mm

The specified values / changes are to be noted in the inspection report!

17.7 Canopy porosity measurements

At all subsequent measuring points, the air permeability should be higher than at least 20 seconds (after Kretschmer). For smaller air permeability values, the paraglider must be sent to the manufacturer. Measuring points: The porosity measurements according to the Kretschmer measuring method (please observe the operating instructions) should be carried out at the following points on the cap. Perform tests on the lower and upper sails:

- 1) middle cell about 20 - 30cm behind the leading edge

- 2) 3rd cell from the middle left/ right approx. 20 - 30 cm behind the leading edge
- 3) 10th cell from the middle left/ right about 20 - 30 cm behind the leading edge

The specified values/ changes are to be noted in the inspection report!

17.8 Connecting parts

Checking the risers and und quick link openings:

- 1) are there chafe marks, kinks, cracks, strong signs of wear?
- 2) is all stitching tight?
- 3) is the accelerator movement free and intact?
- 4) are the brake loops still tight and firmly sewed?
- 5) are the line locks corrosion-free, is the thread free to move?
- 6) are the quick link openings/ line locks corrosion-free, is the thread tube clear and intact? Measurement under a load of 5 kg. The determined values are to be compared to the specifications from the DHV certificate form as a declaration of conformity.

Permitted deviations can be found in the manufacturer's instructions. If the shoulder strap or parts of it are defective, spare parts must be ordered from the manufacturer and the defective parts exchanged for an original spare part.

The specified values/ changes are to be noted in the inspection report!

17.9 Lines

Checking the line tear strength: Line selection: A medium A, B and C main line and, if available, a medium A and B cascade line are selected and checked for their tear strength with a tensile strength tester.

Pull speed of the pull cylinder: $v = 30 \text{ cm/ min}$

17.10 Tensile strength values and tear resistance

The specified values / changes are to be noted in the inspection report!



PAY ATTENTION_ A fixed value is assigned to each size (line diameter). If the lines cannot withstand the specified tensile load or tear resistance, all other lines must also be replaced. If the tested lines meet these test criteria, only the others will be replaced by new ones. All replaced lines must be marked near the shackle (seam) with a black pen and noted in the test report with the date of the exchange and amount of flight hours from the device. At the next check, an original line nearest to the replaced one is used for the line strength test. A minimal sewing length is assigned to the different line diameters!

17.11 Checking line lengths and fixings

Visually inspect the main, cascade and brake lines for cracks, kinks and chafe marks. First the A-line level, then B. etc.

- 1.) are all lines and their fixings sewn and attached correctly?
- 2.) is the coating of the lines intact?
- 3.) are all loops, knots and sewing in good condition?
- 4.) are there chafe marks?

17.12 Line length measurements:

Measuring the line lengths is part of the regular data check. The lines must be measured with a load corresponding to 5 kg in order to obtain comparable results. You can find the corresponding line lengths in the aerial sports equipment description sheet in your manual.

- 1) The measurement is carried out according to the DHV method from the (line) shackle to the cap (including the line loop on the cap).
- 2) The numbering is from the centre of the screen to the Stabilo. The measurement of the opposing wing side can also be carried out under the same conditions by a symmetry comparison
- 3) The result is noted again in the test protocol and compared with the nominal line lengths of the DHV-data sheet. The tolerance deviation should not be more than +/- 1.5 cm
- 4) If a line is defective, it must be replaced immediately. Please take the description of the lines from the line plan, order from the manufacturer and then install or have them installed accordingly by authorized professionals.

The specified values / changes are to be noted in the inspection report!

17.13 Stitch/ Sewing control of trimming and settings

Before a check flight, the canopy and lines must be checked visually when the device is laid out flat and pulled up lightly. Particular attention should be paid to the length of the control

lines (brake lines) when the glider is open. A check flight may only be carried out when all concerns regarding incorrect adjustment of the control lines (brake lines) have been removed.

Please revise and study your paraglider manual

17.14 Miscellaneous

All measurement and repair work on the paraglider and rescue system must be fully documented in the inspection report. When repacking the rescue system, it is essential to pay close attention to the special packing method of the rescue system! See the rescue equipment manual for details. When replacing components or modules/ units, only original materials or original spare parts may be used! When sewing, the original sewing pattern must be observed, only use patch and thread material of the same strength and quality as the original! The verification and/ or measurement/ inspection protocol must be signed, (if an authorized dealer or service centre, stamped) including place and date!

18 IMPORTANT -> carried out inspections

- 1) Before you carry out your own tests and/ or repairs on your paraglider, we ask you to carefully read the following pages attentively. You inform yourself about the terms and conditions of a two-year examination/ check manually and carried out by yourself.
- 2) According to the new DHV regulation, the customer (glider owner) can carry out the 2-year inspection of the paraglider with his own responsibility with the help of the inspection instructions and all necessary equipment and documents. The paraglider does not have to be sent to the manufacturer for it
- 3) The 2-year inspection/ check may only be carried out personally by the paraglider owner if he/ she meets the requirements, or by the manufacturer and his authorized inspection bodies. Contact and advise with the manufacturer for any authorized test centres/ dealerships
- 4) The owner of the glider must be aware of the responsibility that he assumes with a personally and manually carried out 2-year inspection. The single-handed 2-year check is only legally effective if it is confirmed after the test with the date, printed name (in capital letters) and signature on or next to the seal of approval
- 5) Packing interval for rescue equipment acc. DHV: Repacking every 4 months. Permissible operating time: 8 years, then up to 12 years with an annual inspection
- 6) You should inform your insurer in good time/ advance about the legal effects of your own two-year review and check

- 7) An inspection is only valid if the inspection report is completely filled out. Also inform yourself about possible changes to the inspection instructions from the manufacturer before executing the check
- 8) Important: If the necessary expenses/ resources for the maintenance check are insufficient or cannot be made entirely (see necessary equipment and documents), the glider should be sent to the manufacturer
- 9) For paragliders, harnesses and rescue equipment that are not checked, controlled, repaired, exchanged, packed, new or repacked, flown in and/ or other maintenance work carried out other than by GRAVITY-authorized personnel, all warranty and guarantee is void!
- 10) All maintenance work must be carried out in accordance to the maintenance information in the operating instructions/ manual and the special maintenance instructions of the manufacturer and the publications of the IHB
- 11) In the event of unusual occurrences and events during the execution of the maintenance work, a technical manager from GRAVITY itself or any authorized dealer/ competence centre is to be informed, who has to decide on further procedures
- 12) When replacing components, spare-parts or units, only original materials or original spare parts are to be used!

GRAVITY airsports & more GmbH accepts no responsibility, liability and/ or guarantee for checks, inspections and repairs which are not carried out by the manufacturer or any authorized service dealer/ centre.



Stefan Berger
owner & sales