



Owners Manual Skyman Tandem 39

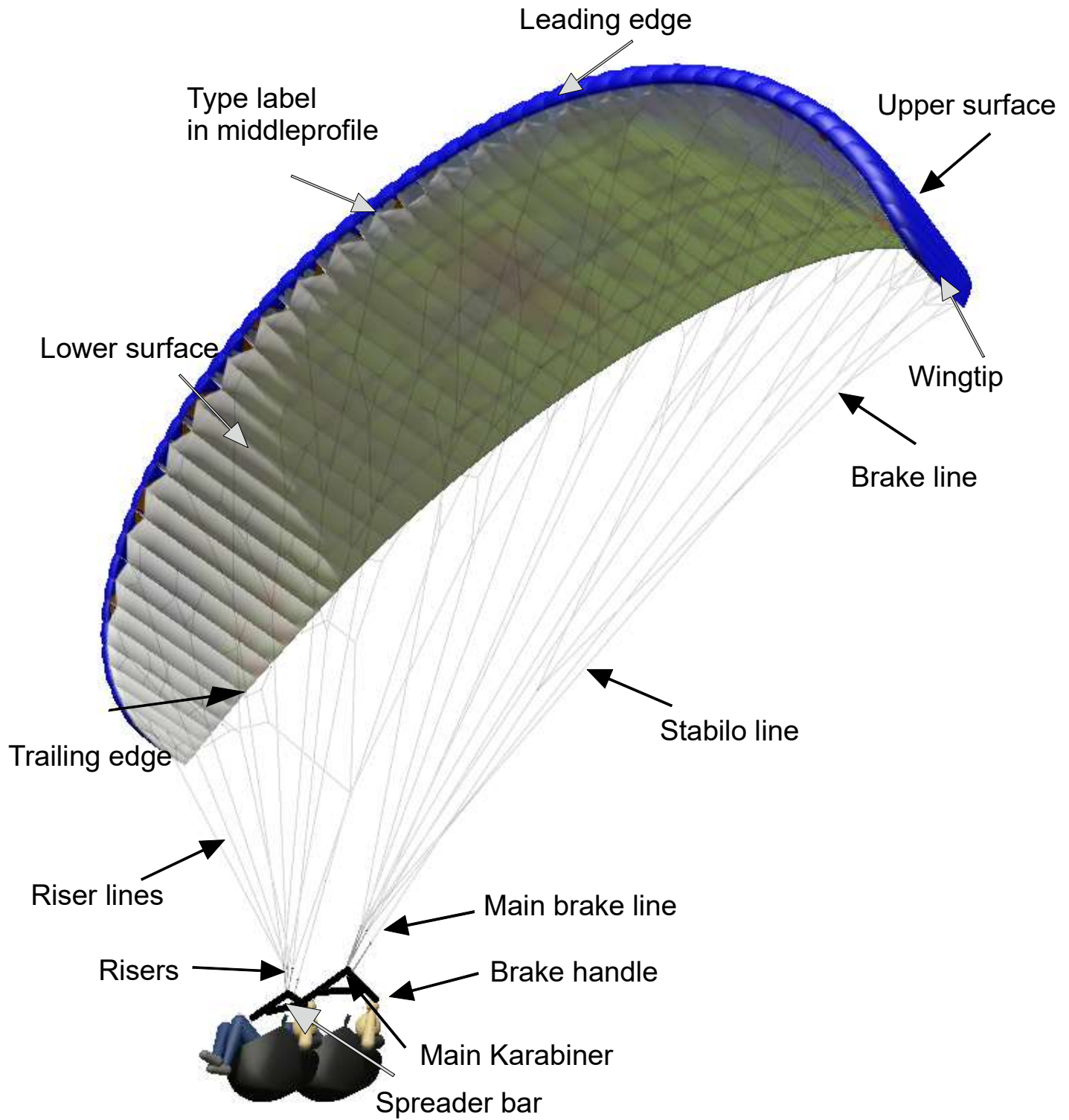
Version 1.0 Stand 19.03.2025

Fly market GmbH & Co. KG

Am Schönebach 3
D-87637 Eisenberg
Tel.: +49 (0) 8364 9833-0
Fax: +49 (0) 8364 9833-33
Email: info@Skyman.aero



Technical Drawing:





1. Dear Skyman Pilot

We are pleased to welcome you to the world of Skyman paragliders. The Skyman Tandem 39 was developed for those biplace pilots who enjoy very good performance, high speed and high manoeuvrability and do not want to do without safety.

Like every paraglider, the Skyman Tandem 39 also has its own character and wants to be flown in its own way. In order to provide you with the greatest possible flying pleasure, we have compiled the following owner's manual.

2. Important Notes:

Reading this manual is mandatory!

The paraglider must not be put into operation without careful study of this manual in order to avoid operating errors. We hereby expressly point out that no liability can be accepted for any consequences of improper handling.

This paraglider is a 'light air sports glider with an empty mass of less than 120 kg in the paragliding category. At the time of delivery, it complies with the provisions of the German airworthiness requirement LTF NFL 2024-2-785 and the European standard EN 926-2:2015-06, category B in each size

New gliders must be flown in by the seller. This flight-in must be confirmed with date and signature on the enclosed measurement report and on the paraglider's type label.

Any unauthorised modification to the paraglider will invalidate the operating licence!

The pilot is responsible for the airworthiness of his glider! The pilot is also responsible for ensuring that all legal requirements for the operation of the glider are met (e.g. pilot's licence, insurance, etc.)

It is assumed that the user's abilities meet the requirements of the equipment!

Use of the paraglider is exclusively at your own risk! The liability of the manufacturer or distributor is excluded!

Any unauthorized modification to the paraglider will invalidate the operating license!

The pilot is responsible of the airworthiness of his glider! It is also the pilot's responsibility to ensure that all legal regulations necessary for the operation of this glider are met (e.g. pilot license, insurance, etc.).

It is presupposed that the abilities of the user correspond to the requirements of the device!

The use of the paraglider is at your own risk! The liability of the manufacturer or distributor is excluded!

The following manual has been compiled to the best of our knowledge and belief. However, it is quite possible that different aspects may change in the course of time due to (flight) technical innovations or changed approval tests and/or teaching methods. Therefore it is advisable in any case to obtain "updates" in suitable form about possible changed opinions and tests either from us or from the appropriate authorities.

3. Target group:

The Skyman Tandem 39 is a tandem paraglider that is classified in category B according to LTF 2024-2-785 and EN 926-2:2015-06. The Skyman Tandem 39 is technically identical to the Airtaxi 3 - 39. According to EN926-2:2015-06, the flight characteristics in this class are described as follows: 'Paragliders with good passive safety and forgiving flying characteristics. Gliders with some resistance to departures from normal flight.'

The required pilot skill level is described as: 'For all pilots; may be suitable for pilots in training if recommended by the manufacturer.'

Whether the Skyman Tandem 39 is finally suitable for your own flying purpose and skill level should always be discussed in person with the specialist dealer.

We recommend that every pilot completes a safety training course and plays with the glider on the ground as much as possible. Perfect control of the glider on the ground and in the air is the key to maximum flying fun and the best insurance for accident-free flying.



4. Technical Description:

Canopy construction:

The Skyman Tandem 39 is made from lightweight, double-coated Dominico 20D nylon fabric and fabric from NCV Industries. A reinforcing yarn is woven into these synthetically manufactured fabrics, which prevents tearing and increases the tensile strength at the seams. The coating makes the fabric water-repellent, UV-resistant and impermeable to air.

The Skyman Tandem 39 consists of 55 cells. The wing tip (stabilizer) is pulled down and is integrated seamlessly into the canopy.

The canopy is ventilated through openings on the underside of the profile nose. Cross ventilation is provided by precisely dimensioned holes (cross ports) in the profile rib.

Each main profile rib is suspended from a line connection. They are reinforced in the profile.

Tensioning straps are sewn in between the groups of main lines to regulate the sail tension.

Reinforcements are sewn into the profile nose to ensure high shape retention and stability.

A low-stretch tape is sewn into the leading and trailing edges, which provides a sophisticated tension distribution across the canopy calculated by our construction software

Suspension System:

The lines of the Skyman Tandem 39 consist of polyester-coated and uncoated aramid and polyester-coated PES / Dyneema, depending on the location. The strength of the individual lines varies from 70 to 500 daN depending on the location.

Depending on where the lines are installed, they are divided into upper lines (at the top of the canopy), middle lines, main lines (or riser lines), stabilizer lines (at the wing end) and brake lines (at the top of the trailing edge) and main brake lines (at the brake handle).

The lines are divided into A / B / C / D / E level and brake.

Within each level, 2 gallery lines are combined into one middle line. The 8 gallery lines of the E level are integrated in the D middle lines. On the riser line level, 2 middle lines are grouped into a total of 6 riser lines per level and attached to the corresponding risers.

The stabiliser lines are attached to the B-riser.

The brake or steering lines are combined into the main brake line according to the same principle.

The lines of each level are colored differently for easier control.

The riser of the Skyman Tandem 39 has 3 risers on each side.

The A-riser is divided into a main (A)- and a secondary riser (A'). In the A-riser are 2 main lines and A'-riser 1 main line are attached.

In the B-riser 3 B main lines plus 1 stabilizer line are connected on each side.

The C riser holds 3 C main lines. The upper lines of the E-level are joined to the D-level.

The main brake line is guided to the brake handle via a pulley on the C-riser.

The line connectors are made of stainless steel and are secured with a plastic insert against unintentional opening and slipping of the lines.

There are no adjustable devices available.

The line arrangement is shown in the individual line plan.

Acceleration system:

The Skyman Tandem 39 only has a trimmer system in the C-riser. The riser does not have a foot accelerator.

The trimmer system lengthen the B and C risers and thereby reduces the angle of attack of the canopy - the trim speed increases. In normal flight all risers have the same length (38,5 cm with line link). When the trimmer is operated, the B-risers are extended by up to 3 cm and the C-risers by up to 10 cm. The A-risers are not changed.



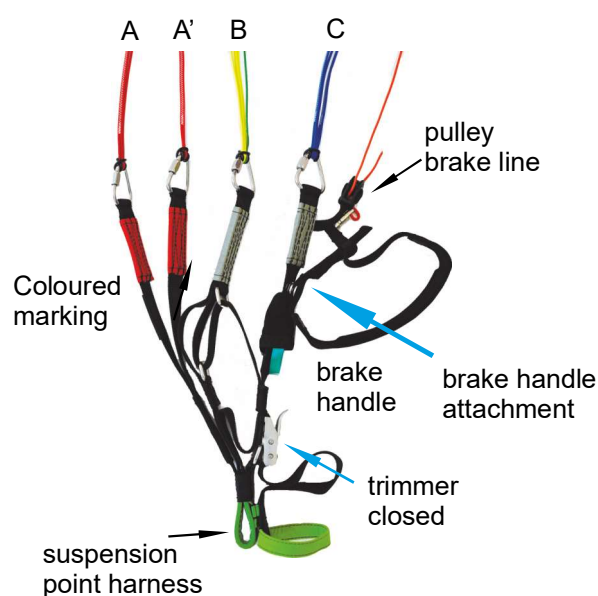
Functionality and handling:

The trimmers influence the take-off and flight behaviour! In the normal flight position, all risers have the same length, i.e. the trimmer is pulled down. To accelerate the paraglider, loosen the trimmer buckle. This extends the B/C risers, reduces the angle of attack and increases the trim speed.

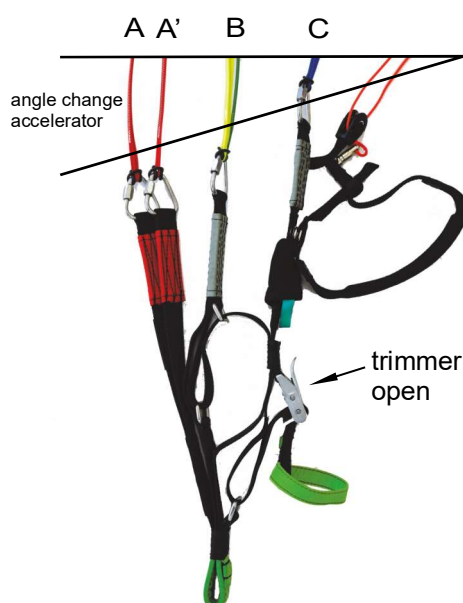
The adjustment buckle allows a stepless adjustment from "completely closed" to "completely open". Both trimmers must always be adjusted symmetrically to the same position.

Varying the trimmer position can also be used to optimise the canopy's inflation behaviour depending on take-off weight and wind conditions.

Overview risers:



trim flight position



accelerated flight position

5. Technical Data:

size		39
Flat surface	m ²	39
Flat span	m	10,22
Flat aspect ratio	A/R	5,47
Projected surface	m ²	33,21
Projected span	m	11,54
Projected aspect ratio	A/R	4,01
Min take off weight	Kg	120
Max take off weight	Kg	200
Recommended TOW min.	Kg	120
Recommended TOW max.	Kg	200
V-Trim	Km/h	37
V-Max.	Km/h	54
LTF / EN Category		B

Changes of these data are possible!



6. Tandem-specific features

The following chapter is not meant to be a guide for biplace flying. Rather, we would like to address some special features of biplace flying that were already taught during the training as a tandem pilot.

6.1. Harness

The Skyman Tandem 39 was tested in accordance with EN 926-2:2013 with harnesses of the following dimensions:

55 cm (+/-2) cm chest strap width, 44 cm (+/- 1) cm suspension height.

When biplace flying, a special biplace harness should be used for the pilot because of the rescue parachute. Such harnesses are optimised for biplace flying in terms of function and comfort.

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A harness with a certified protector should always be used for the passenger. Especially 'pedestrians' who are flying for the first time tend to sit down too early during take-off and landing. This risk of injury can be significantly reduced by using a harness with a protector.

In practice, the passenger's own 'solo harness' is often used. There is nothing wrong with this. Only the reserve parachute must be removed from the harness so that the passenger does not pull the release handle consciously or unconsciously out of panic during the flight.

6.2. Rescue parachute

For biplace flying a special rescue system is necessary. It must be ensured that the rescue system is approved and has at least the same maximum payload as the respective take-off weight. This note is important for the reason that most Biplace rescue systems are only approved up to 200 kg, while the Skyman Tandem 39 is approved up to 220 kg take-off weight.

A rescue parachute with a smaller maximum payload than the paraglider can be used at any time, but the maximum take-off weight is then reduced according to the maximum payload of the rescue parachute!

Under no circumstances may two single-seat rescue parachutes be used whose maximum take-off weight has been simply added together. This can lead to uncontrollable situations in case of an emergency release!

6.3. Suspension point rescue parachute

In general, the rescue parachute may only be connected on both sides of the T-bar at the suspension points provided for this purpose. The Skyman Tandem 39 is delivered with a T-Bar. This already has an integrated reserve bridle (pos. 2), which is usually long enough to mount the reserve in the pilot's harness. Attention: the left and right connecting bridle of the T-Bar must always be connected to the rescue parachute by a suitable connecting link!

If a T-Bar other than the one supplied by the manufacturer is used, make sure that it is type-tested. The eventual special attachment point of the rescue reserve can be found in the manual of the T-Bar.

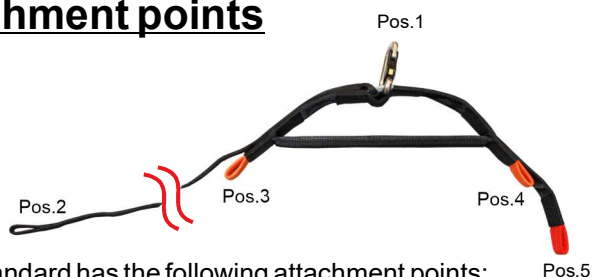
Unsuitable as attachment points/possibilities of the parachute are always:

- Attachment to the pilot's harness, since in an emergency the passenger hangs approx. 1 m lower than the pilot and the pilot falls with his knees on the passenger's back during an impact.
- One-sided mounting, no matter at which point

As a general rule: the installation of the rescue parachute with the harness/T-Bar may only be carried out by a qualified person!



6.4. T-bar attachment points



The T-Bar supplied as standard has the following attachment points:

- Pos. 1: Attachment point for the paraglider (karabiner not included)
- Pos. 2: fixed connection bridle for the rescue parachute (length 200 cm)
- Pos. 3: Attachment point pilot
- Pos. 4: Upper attachment point passenger (normal attachment)
- Pos. 5: lower attachment point passenger (alternative attachment point for light passengers)

If there is any doubt about which attachment point is chosen for the passenger, this must always be tried out on a simulator before the first flight.

6.5. Take-off technique

There are two different, common techniques for take-off:

a) Passenger in front of the pilot:

This take-off technique has the advantage that the pilot, together with the passenger, can build up more tension when pulling up the glider. This take-off technique is mainly suitable for stronger winds. When there is little wind, the take-off path is naturally longer and fast running one after the other is not possible with this technique. Think also of the risk of injury due to accidental kicks by the pilot into the passenger's heel, stumbling or sitting down too early by the passenger, who can no longer be "pulled along" by the pilot with this take-off technique. The pilot will then probably fall over the passenger without being able to abort the take-off in a controlled manner.

b) Passenger beside the pilot:

As during take-off, the landing can be done much better and more unhindered. This is especially important when there is only little headwind. Even in the event of a fall, the pilot does not necessarily fall fully on the passenger, which can prevent injuries. If you land beside each other, you have to plan the final approach long enough so that you can push the passenger to the side with your leg. This sideways shifting should also remind the passenger that the last flight phase has started and he has to raise up. The disadvantage of this method is that the passenger hangs sideways, which may cause a slight turn, which has to be corrected with the brake lines.

6.6 Landing technique

As with the take-off, there are two different landing options:

a) Passenger in front of the pilot:

in case of strong headwinds this landing method is easy, because there is no need to run out on the ground. Otherwise, the same problems can occur as during take-off.

b) Passenger beside the pilot:

As with take-off, you can also run out much better and more unhindered during landing. This is especially important when there is only little headwind. Even if the passenger is falling during running, the pilot does not necessarily fall on the passenger, which can prevent injuries. If you land beside each other, you have to plan the final approach long enough so that you can push the passenger to the side with your leg. This sideways shifting should also remind the passenger that the last flight phase has started and he has to stand up. The disadvantage of this method is that the passenger hangs sideways, which may cause a slight turn, which has to be corrected with the brake lines.



7. Checking the paraglider

Every paraglider delivered is checked and measured several times by us before delivery. Nevertheless, we recommend that you check the new paraglider thoroughly according to the following points.

These instructions should also be followed if the paraglider has to be checked after intensive flight, hard manoeuvres or tree landings.

- The seams on the line suspension loops, on the risers and on the canopy must be checked for damage.
- Are all lines free of damage and correctly sewn?
- Are all line locks correctly screwed and the plastic inserts fastened?
- All the panels, including the ribs and V-tapes, must be inspected for cracks.

Any damage, however inconspicuous, must be inspected and repaired by an expert. A damaged paraglider is not airworthy!

8. Adjusting the steering lines:

The two main steering lines lead to a multiple line branching, which are fixed at the trailing edge. At the risers the steering lines run through a guide pulley and each is connected with a handle. These control handles are attached to the risers with two snap fasteners during transport. The steering line length is set correctly at the manufacturer and normally does not have to be changed. The setting point is permanently marked on the main steering line with an additional sheath. It must have at least 5 cm freewheel in flight (before the brakes take hold) and should not be changed. The improper change of the steering line length changes the flight behaviour and impairs the safety of the glider.

9. Flight operation:

The following pages are not intended to be a guide for paragliding. Rather, we want to introduce you to the special features of the Skyman Tandem 39 and give you some important information for flight and safety. Other special flight manoeuvres or configurations of the glider are not recommended.

9.1. Take-off preparations:

A careful pre-flight check must be carried out before each take-off. The risers, lines and canopy must be checked for wear. It also must be ensured that the line links are tightly closed and secured against twisting with a plastic clip.

The harness must be put on with the greatest care. It is self-evident that the pilot is responsible for the correct putting on of the passenger harness! After putting on all buckles have to be checked again if they are closed correctly. The correct closure of the rescue system container and the correct fit of the rescue system handle must also be checked (see harness manual).

If a defect is found, do not take off under any circumstances!

The Skyman Tandem 39 can best be started if it is laid out in an arch. When laying out, the canopy must be laid out against the wind.

Separate the lines and brake lines carefully and sort the risers. All lines must be free and without entangling or knots. There must be no lines under the canopy.

Once all preparations have been completed, the main carabiners of the tandem spreader (the tandem spreader is usually not detached from the pilot harness) are connected to the risers. The passenger harness is only connected to the tandem spreader when the pilot is connected to the paraglider. Make sure that the carabiners are closed.



Checklist:

Paraglider:

- Canopy without damage?
- Risers and spreader bar without damage
- Line links tightly closed?
- Lines without damage?
- all lines free and without entanglement and knots? Also brake lines?

Harness:

- Rescue system container closed?
- Rescue system handle correctly attached?
- all buckles and main carabiners closed (also on passenger harness)?

Take-off:

- Helmet on (also passenger)?
- Risers not attached twisted?
- Trimmer set symmetrically?
- Brake handle and correct riser taken up?
- Is the pilots position in the middle so that all lines are symmetrically tensioned?
- Is the wind direction okay?
- Obstacles on the ground?
- Air space free?

9.2. Take-off:

The Skyman Tandem 39 is very easy to launch. We generally recommend using both A-risers (A and A') when launching. Depending on the launch technique, wind conditions and terrain, you can alternatively use only the centre A-risers to pull up the paraglider.

The trimmers can be opened slightly symmetrically depending on the situation.

For better orientation, the different riser levels are colour-coded and labelled.

The pilot, who is ready for take-off, holds the A-risers and brake handles in his hands on each side and pulls the A-lines slightly. If the take-off area is flat and there is little wind, you can alternatively take a step back towards the canopy and pull up the paraglider with more impulse. During the take-off run, the arms are first stretched sideways to the rear in line with the A-risers and are guided upwards as the paraglider rises.

As with all gliders, the most important thing when launching is not the force but the constancy of the tension. As the Skyman Tandem 39 is very easy to inflate, it needs to be braked on steep take-off areas or in strong winds to avoid overtaking the canopy.

When launching the glider backwards in strong wind, it is easy to prevent premature take-off by following the glider while it is being pulled up. The best preparation for perfect strong wind launches is still playing on the ground for hours in the wind.

9.3. Straight flight:

The Skyman Tandem 39 has a trim speed of 37 to 39 km/h depending on the wing load with fully released steering lines. In calm air the Skyman Tandem 39 reaches the minimum flying speed (depending on the wing load) with about 55 to 60cm brake line pull. In turbulent air we recommend to fly with 5 to 15 cm pulled steering lines. The current angle of attack of the canopy is then higher and it is more difficult to undercut the air at the profile nose.

According to EN 926-2, the maximum symmetrical control travel is at least 55 cm up to 80 kg take-off weight, at least 60 cm from 80 kg to 100 kg take-off weight and at least 65 cm from 100 kg take-off weight.

We understand all indicated cm values from the point where the trailing edge is pulled down, i.e. without the freewheel.



9.4. Accelerated flight:

The acceleration system is designed as a trimmer system on the C-riser. The angle of attack of the canopy changes and the Skyman Tandem 39 flies approx. 8-10 km/h faster. Due to the higher speed, the paraglider is more unstable and collapses more easily and violently.

For safety reasons you should therefore only fly in calm air and at a sufficient distance from the ground. Never let go of the brake handles during accelerated flying!

When flying into turbulence, the acceleration system must be deactivated immediately!

If the glider collapses, the acceleration system must be deactivated immediately, then the canopy is first stabilized by the steering lines and then reopened.

9.5. Turns:

The high agility of the Skyman Tandem 39 is due to its special steering characteristics: It reacts very directly and without delay to control impulses.

By shifting the weight (the pilot leans on the inside of the curve), very flat curves can be flown with minimal loss of altitude.

Weight shifting and pulling on the inner steering line is suitable for fast changes of direction.

For thermal flying, the combination of weight shift, braking on the inside of the curve and controlled additional braking on the outside of the wing is best recommended. By pulling in the opposite direction and releasing (active flying) with the inner and outer brake, the curve radius and lateral position can be changed and the centering of the thermals can be optimised.

Attention: if the steering lines are pulled too far or too fast, there is a risk of stall!

A one-sided stall is clearly announced: the inner side of the wing curve becomes soft and the inner third of the wing almost "stops". If this flight condition has occurred, the inner brake must be released immediately.

9.6. Active flying

Active flying can prevent many collapses in advance!

Active flying means to fly the paraglider as stable and efficient as possible by shifting weight and steering impulses.

In turbulences and rough thermals the glider should always be held vertically above you by active flying with controlled brake inputs.

When flying into strong thermals, the angle of attack of the paraglider increases. If the brakes are released while flying into the thermals, the canopy can accelerate and remains almost above the pilot's head. The situation is different when flying into down winds: here the brakes are applied in a controlled manner.

9.7. Landing

The Skyman Tandem 39 is easy to land. In the final glide against the wind the wing can be let out slightly braked. At a height of approx. 1 m above ground, the angle of attack is raised and intercepted by an increased braking level. The time of landing should coincide with the full use of the brakes.

If there is a strong headwind, the use of the brakes should only be very controlled in order to avoid a stall before landing!

On this occasion we would like to suggest not to reduce the altitude by the risky bad habit of "pumping" if the approach is too high.

Also landings with steep curves or turns in the final approach are to be avoided absolutely.

After the landing the wing should not fall on the ground with the nose first. This can destroy the profiles and impair the material in the leading edge area on the long run!



10. Winch towing

The Skyman Tandem 39 is suitable for winch towing. We recommend opening the trimmers slightly symmetrically during towing. This accelerates the glider during the towing process and not only simplifies the launch procedure, but also reduces the risk of stall and enables higher release altitudes.

Attention: Paragliders which are damp and/or whose line lengths/air permeability values are no longer within the permitted tolerance have a significantly increased risk of deep stall when towing with a winch!

Winch towing is only permitted with a valid winch towing licence. The special features of a towing site and the equipment used (winch, towing release, etc.) should always be discussed with the winch operator and the take-off officer first.

We expressly point out that the equipment required for towing must also be certified in any case.

11. Powered flight

The Skyman Tandem 39 is currently not certified for flying with a paramotor or trike.

12. Extreme flight situations

12.1. Side collapse

A side collapse is probably the most common malfunction in paragliding. If the Skyman Tandem 39 collapses in turbulent air, this usually only occurs in the outer wing area.

In order to maintain the flight direction in this flight condition, the opposite, open wing side has to be braked.

If the canopy collapses very hard, the braking of the open side may only be very dosed to avoid a stall.

After the turning away has been prevented by counter-steering, the canopy can be opened again at the same time by pumping on the folded side.

If the side collapse is not actively counteracted, the Skyman Tandem 39 usually opens automatically within less than half a turn. If the canopy does not open automatically due to the strong turbulence or other influences (entangled lines), the paraglider will turn into a spiral dive.

12.2. Entangled lines

In the event of large collapses or other extreme situations, any paraglider may become tangled. The collapsed sections of the wing tip will get caught in the lines. Without pilot reaction the glider turns into a very strong spiral.

Once this has happened, the turning of the wing must be stopped first by a sensible counter-brake.

If the rotation speed should continue to increase despite counter-action, the rescue parachute must be released immediately at low altitudes.

If the height is sufficient, the following possibilities can be used to try to release the entangled wing tip:

- Try a sensitive counter-braking and a very fast, resolute and deep pulling of the steering line at the entangled side.

- Pull the coloured Stabilo line.

If these measures are not successful, you can try to release the entangled wingtip with a full stall if the height is sufficient.

Attention:

The flight manoeuvres mentioned above are very demanding and can cause high altitude loss! If the pilot feels overstrained or if there is not enough altitude, the rescue system must be activated immediately!



12.3. Front stall

The collapse of the entire leading edge is usually caused by strong pulling on the A-belts, accelerated flying or sudden strong turbulence. Although this flight disorder looks spectacular, it is often not dangerous if the collapse depth is low. Often there are no turning movements, the glider usually opens quickly by itself and quickly picks up speed again. The opening can be accelerated by braking in a controlled manner on both sides.

Timely recognition of the situation and quick reaction by braking on both sides helps to keep the loss of altitude as low as possible and not to lose control of the malfunction.

12.4. Deep stall

During a deep stall, the paraglider has no forward speed and at the same time significantly increased sink rates. The deep stall is caused, among other things, by releasing the B-risers too slowly when the glider is in a B-stall, by an old and porous cloth, by damage to the lines or ribs, by pulling the C-risers or by an inadmissible take-off weight. Even if the canopy is wet or the air temperature is very low, the tendency to stall increases.

Flying in the rain should be avoided as far as possible, as the raindrops on the canopy increase the V_{min} and thus the tendency to stall increases. Also very low temperatures can be problematic. In both cases, especially when the brakes are applied and/or the line geometry is no longer trimmed correctly.

If the glider is in a deep stall, you can recognize this by the fact that the noise is very low and the glider is in an unusual position above the pilot. In this case it is absolutely necessary to release the steering lines!

If the canopy and lines are in good condition, the Skyman Tandem 39 will automatically pick up speed again within 2 to 3 seconds. If, for whatever reason, this is not the case, the A-risers must be pushed forward or the acceleration system must be activated.

If a glider has been in a continuous stall for no apparent reason (e.g. wet glider, flight in rain or inadmissible take-off weight), it must be checked before the next flight.

Attention: The brakes must not be applied in deep stall flight, as the paraglider immediately enters the full stall. A stable stall may no longer be released near the ground due to a possible pendulum movement. Instead, the pilot prepares himself for a hard landing, if possible with a landing fall.

12.5. Full stall

A full stall is a pilot manoeuvre that can be very demanding, especially due to the high weight of a tandem paraglider. To initiate a full stall, both brake lines must be pulled all the way through. On reaching stall speed, the canopy deflates abruptly and suddenly tips backwards.

It is very important to keep the brake lines pulled through until the deflated canopy comes back over the pilot (approx. 3 to 6 seconds) and stabilises in this position, despite the unpleasant canopy reaction during a full stall.

Only now the steering lines are reasonably fast (switching time ≥ 2 sec) and symmetrically released. The optimal recovery should take place in 2 phases: 1. prefilling of the canopy (slow release of the brakes up to shoulder height) until the canopy is fully open again; 2. recovery (braking to 0%).

If the canopy is released too quickly or asymmetrically, the result may be a large collapse or front stall.

Attention: A wrong, too early, asymmetrical or too fast released full stall can result in an extremely wide forward movement of the canopy! In extreme cases under the pilot!

12.6. Spin

By stalling one side, the flow can break off at half of the wing. This reverses the direction of air flow. The trailing edge, which is deeply braked, is then streamed from the back and flies in the opposite direction and the canopy rotates around its vertical axis.

There are 2 causes for a spin:

- A brake line is pulled through too quickly and too far (example: initiating a spiral dive).
- in slow flight one side is braked too much (example: in thermal circling)

If an inadvertently initiated negative turn is immediately released, the glider returns to normal flight without great loss



of altitude. If the negative turn is held longer, the glider can accelerate and shoot forward on one side. This can result in an impulsive collapse or entanglement.

12.7. Wingover

Tight turns to the left and right are flown alternately. The cross slope is progressively increased. If the dynamics and lateral position of this flight manoeuvre is too high, the outer wing can relieve the load. If the lateral inclination is further increased and the reaction is wrong, the result may be an impulsive, large-scale collapse.

Full stall, spin and wingover on all paragliders can have life-threatening consequences!!

12.8. Emergency steering

If the steering lines fail, the "Skyman Tandem 39" can easily be steered by using the rear risers. The distance to the stall is of course much shorter when steering with the rear risers than with the steering lines, it is about 10 - 15 cm with the "Skyman Tandem 39". You can also fly light curves by pulling the Stabilo lines or by weight shifting.

13. Decent aids

13.1. Spiral dive

The spiral dive is the most efficient way to descend fast. However, high loads occur for material and pilot. It has to be taken into consideration that, depending on the daily shape, the outside temperature (cold!) and the sink rate, you may sooner or later lose consciousness. Many pilots slow down their breathing during the spiral or go over to press breathing, which increases the risk of losing control even more. At the first signs of dizziness, loss of consciousness and loss of vision, the spiral must be immediately stopped.

The spiral dive is initiated by carefully pulling the brake line on one side and shifting the weight to the inside of the curve. Due to the direct handling the Skyman Tandem 39 quickly takes a high lateral inclination and flies a steep turn. As soon as the wing comes in front of the pilot (goes on the nose) an impulse is generated, which the pilot should follow by shifting his weight to the outside of the curve.

The sink rate and inclination in the spiral dive are increased by a controlled pulling of the brake line inside the curve. Slight braking on the outside of the curve prevents the outer wingtip from collapsing.

To exit the spiral dive, the brake inside the curve is slowly released.

Rapid release of the brake means that the high airspeed (up to over 100 km/h) is translated in a strong pendulum movement into height. The result is an extreme deceleration at the end of the pendulum movement with subsequent tilting of the canopy. You also have to calculate that you will get into your own wake vortex (rotor)!

Due to the extreme loss of height in the spiral dive, it is always important to ensure sufficient safety height!

Attention: Almost every paraglider reaches a sink rate at which the canopy faces the openings downwards ("goes up on the nose!") and remains in this position despite releasing the steering lines and continues to spiral (stable spiral dive).

The Skyman Tandem 39 has been classified B according to EN 926-2:2013. Due to unfavourable influences, however, the reactions can also be more demanding than described in this classification. The causes in such a case can be complex. For example: harness geometry (suspension height), cross straps, turbulent air, holding on to the riser, shifting the pilot's weight to the inside of the curve and similar.

If, against all expectations, a stable spiral dive should occur, this is released by shifting the pilot's weight to the outside of the curve and counter-braking in a controlled manner.

Attention: in a stable spiral dive, extreme G loads can have an effect on the body and require a lot of physical strength!



13.2. Big Ears

The so called "big ears" manoeuvre is an easy, but not very effective descent method where the forward speed is higher than the descent speed. It is more suitable to reduce the glide angle and to gain horizontal distance from a source of danger than to descend fast.

To perform "big ears", the two wingtips are folded symmetrically downwards by pulling the outer A-risers (A').

The "big ears" can increase the descent speed to approx. 5 m/sec. and reduce the glide angle.

By using the foot accelerator the sink rate and the forward speed can be increased significantly.

It is sufficient to release the outer A-risers to exit this manoeuvre. The wing tips of the Skyman Tandem 39 usually opens automatically. The pilot can slightly brake to speed up the opening.

Attention: Never fly a spiral dive with big ears, because the middle A-lines are loaded beyond their limits.

13.3. B-Stall

The B-stall is easy to enter with the Skyman Tandem 39. The B-risers are slowly and symmetrically pulled down to 20 cm. The airflow stops and the glider descends vertically.

To exit the manoeuvre it is sufficient to raise the B-risers again in a time of approx. 1 second.

If the glider starts to rotate during the B-stall or if it forms a collar, the flying manoeuvre must be immediately released. The reasons can be: turning: asymmetrical pulling of the risers, 1 B-riser and 1 C-riser pulled down; collar: too excessive pulling of the B-risers.

All descent aids should only be practised in calm air and at a sufficient safety height, preferably as part of a safety training, in order to be able to use them in emergency situations!

Summary:

This is valid for all extreme flight manoeuvres and descent aids:

- first practice only under the guidance of a flight instructor or as part of a safety training course
- before starting the manoeuvres, ensure that the airspace under the pilot is free
- During the manoeuvre the pilot must have eye contact with the canopy and constantly check the altitude.

14. Folding, Care, Storage, Repairs, Maintenance, Disposal

The condition of the paraglider affects your life in the air. A well-kept and properly treated paraglider can reach twice its age. To ensure that the Skyman Tandem 39 carries its pilot as long as possible and safely through the air, please consider the following points:

Folding:

For a long durability of the paraglider and to avoid unnecessary kinking of the nylon rods in the nose area, we recommend to fold the glider profile on profile (similar to an accordion), or to roll it together loosely seen from the stabilizer (without kinking the nylon rods). Improper packing and prolonged storage may cause deformation of parts in the glider.

Care:

- The UV rays of the sun damage the fabric of the paraglider in the long run. Therefore the paraglider should not be unnecessarily exposed to sunlight.
- When unfolding the glider, make sure that neither the canopy nor the lines are heavily soiled. The dirt particles can damage the material.
- The line lengths should be checked after tree and water landings.
- Do not pull the paraglider over the ground. The coating of the cloth will be damaged.
- Moisture damages the coating of the cloth and shortens the service life.
- If the lines stick to the ground, they can be overstretched or torn off during take-off.
- Do not step on the lines!



- When folding up, please place the supplied textile bag underneath to avoid mechanical abrasion and damage of the sail.
- The lines should be bended as less as possible.
- After contact with salt water, rinse the equipment immediately with fresh water!
- Insects that got lost in the cells should be removed alive, not only because of animal love, but also because they secrete a corrosive liquid.
- Clean the paraglider only with water. Avoid mechanical stress such as brushing and rubbing. Chemical cleaning agents damage cloth and lines.

Storage:

- The paraglider must always be stored in a dry place. If it gets wet, spread it out to dry as soon as possible (but not in full sunlight!).
- Do not store the glider near chemical vapours or gases.
- During transport and storage, especially in cars, make sure that the paraglider is not exposed to unnecessarily high temperatures.

Repairs:

- Smaller rips in the fabric that do not run along the seam can be provisionally repaired with an adhesive sail from a paraglider dealer.
- All other types of damage, such as large rips, rips at seams, torn line hangpoints, torn and damaged lines may only be repaired by an authorised workshop or the manufacturer.
- Only original spare parts are to be used! A list of the lines used in the glider model can be found in the individual line plan under item 16 "Individual line lengths". The lines can only be purchased from the manufacturer.
- Any modification to the paraglider, except those approved by the manufacturer, will void the operating license of the equipment.

Maintenance:

- The Skyman Tandem 39 must be inspected at least every two years or every 100 operating hours by an authorized workshop or by the manufacturer.
- A line measurement should be performed every 20 flying hours and should be compared with the data sheet.

Disposal:

- The materials used in a paraglider require proper disposal. Please return used equipment to us. We will dispose them properly.

15. Nature and landscape friendly behaviour

Actually self-evident, but here again expressly mentioned: Please practice our nature-orientated sport in such a way that nature and landscape are protected!

Please do not walk off the marked paths, leave no rubbish behind, do not make unnecessary noise and respect the sensitive balance in the mountains. Especially at the take-off place our respect to nature is required!

16. Line lengths

Ageing of lines and trimming possibility

So far it has always been thought that lines stretch under use. In the case of the middle A and B lines - where the heaviest load is attached - this is even true.

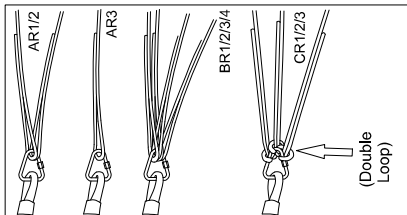
All lines (Kevlar as well as Dyneema lines) get cracks in their thin threads and then they begin to swell and shrink. The rear C lines and the outer A, B, C lines are loaded with only a few grams during flying. This leads to a slow shortening of the lines - because there is not enough load on the lines to stretch them during flying. On the technical side, almost nothing can be done. The Skyman Tandem 39 is equipped with a minimal faster trim (+mm to C) to avoid this shortening.

Less stressed lines are delivered with a trim knot. This can be used to lengthen the line if necessary.



The service company or the pilot now has the possibility to trim the glider without any problems and without having to replace the lines. A line measurement should be performed every 20 flying hours and should be compared with the data sheet. It is completely normal that lines can shrink by up to 30 mm at very intensive use.

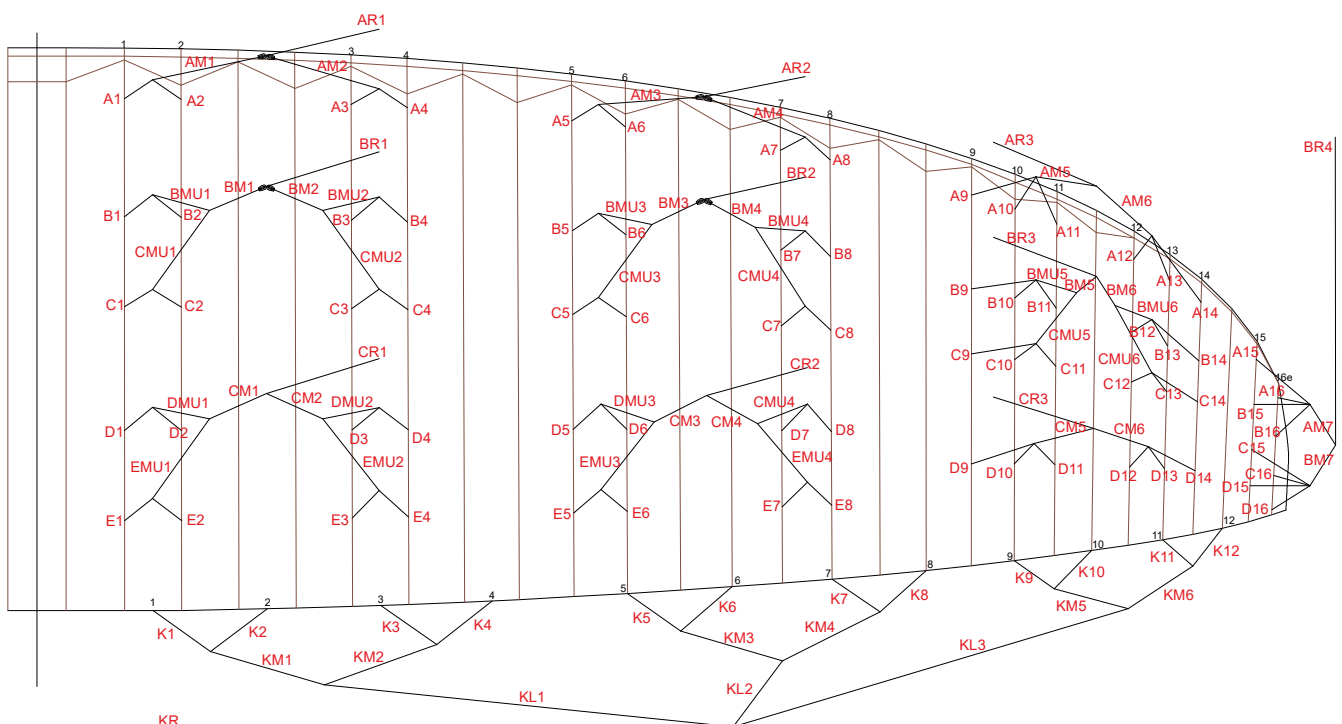
All line changes are gradual. So they do not occur suddenly. You also do not crash, but often you only notice this when you are less able to fly against the wind or when the glider loses some of its performance.



Factory delivered configuration with double loop on BR4, C-riser lines for trimming during aging

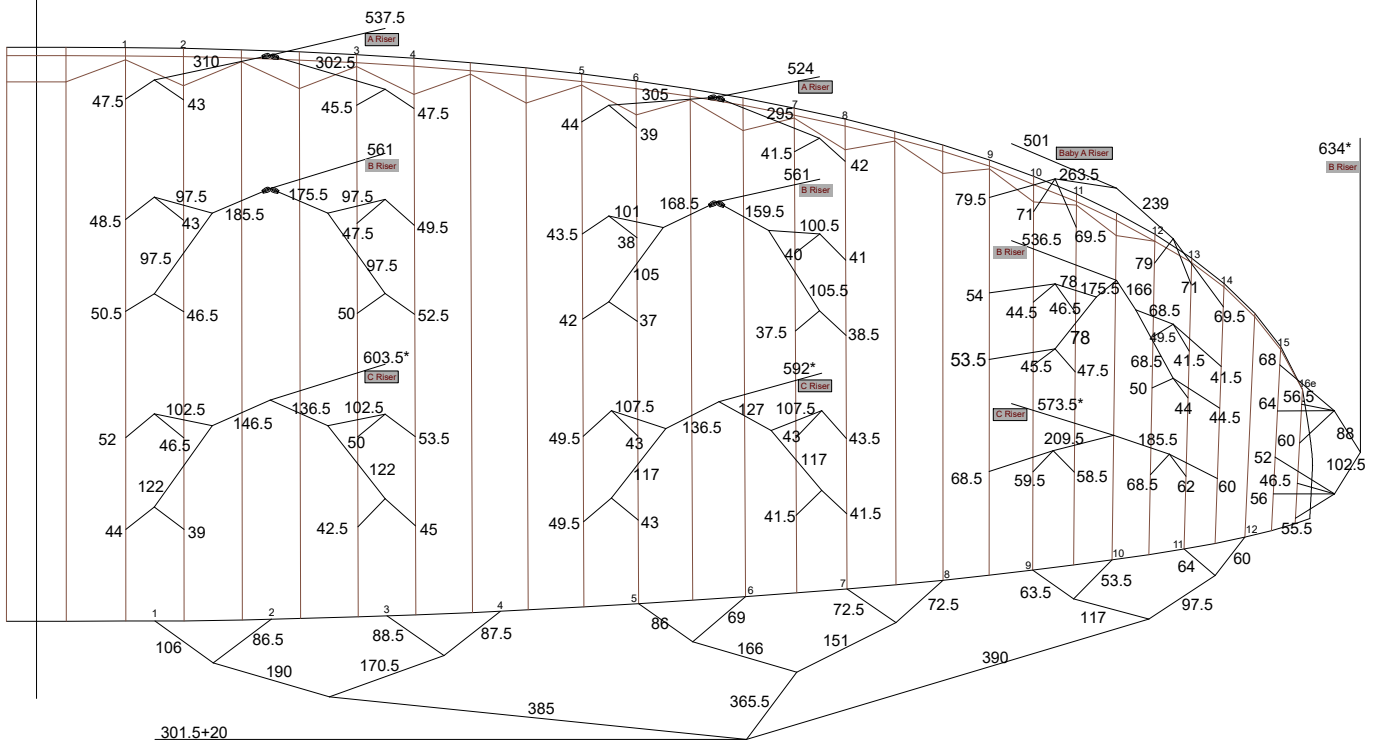
16.2. Line names

All lines in Skyman gliders are labelled according to the same scheme. When ordering replacement lines, please always determine the designation according to the following overview and order by specifying the type and size of the canopy.





16.3. Single line length Skyman Tandem 39



* = main lines with double loop



16.4. Line articles used

Name	A1 - A4	A5 - A16	B1 - B4	B4 - B16	C1 - C4	C5 - C16	D1 - D4	D5 - D16	E1 - E8
Article	8000-135	8000-090	8000-135	8000-090	8000-135	8000-090	8000-135	8000-090	8000-090
Name	BMU1/2	BMU3-6	CMU1/2	CMU3-6	DMU1 - 4	DMU1 - 5	EMU1 - 4		
Article	8000-230	8000-190	8000-230	8000-190	8000-190	8000-190	8000-190		
Name	AM1/2	AM3/4	AM5/6	AM7, CM7	BM1/2	BM3/4	BM5/6	CM1 - 4	CM5/6
Article	8000-280	8000-230	8000-190	8000-090	8000-280	8000-230	8000-190	8000-230	8000-135
Name	AR1, BR1	AR2, BR2	AR3, BR3	CR1 - 3	BR4				
Article	TSL-500	7343-420	7343-340	7343-340	7343-190				
Name	K Riser	KL	KM	KTop					
Article	10-200	PPSLS-125	DSL-070	DSL-070					

17. Total line lengths

All line and riser lengths listed below are in accordance with the test specimen as per EN 926-2:2013. The specified lengths have been checked by the test centre and are within the tolerance permitted in the standard.

The lengths are measured from the riser attachment point to the lower sail, brake lines to the end of the main control line under 50 N tension.

17.1. Total line lengths Skyman Tandem 39

in mm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	9340	9295	9245	9265	9120	9070	8995	9000	8830	8745	8730	8580	8500	8485	8275	8160
B	9315	9260	9205	9225	9130	9075	9000	9010	8830	8735	8755	8595	8515	8515	8235	8195
C	9335	9295	9230	9255	9155	9105	9025	9035	8825	8745	8765	8600	8540	8545	8260	8205
D	9420	9365	9300	9335	9230	9165	9070	9075	8890	8800	8790	8650	8585	8565	8300	8295
E	9535	9485	9420	9445	9325	9260	9150	9150								
Brake	9825	9630	9455	9445	9190	9020	8905	8905	8720	8620	8530	8490				

17.2. Riser lengths Skyman Tandem 39

mm	normal	accelerated
A	385	385
A`	385	385
B	385	410
C	385	475

Lengths measured from the attachment point of the riser to lower edge of shackle



18. Inspection instructions Skyman Tandem 39

The purpose of this inspection instruction is to ensure the flight safety of the paraglider to be inspected. In Germany it is legally based on the German Aircraft Inspection Regulations (LuftGerPV) and represents the minimum technical requirements for equipment and scope of inspection.

Depending on the country of operation, country-specific requirements may have to be observed. The minimum requirements must not be reduced.

Attention! Fly market GmbH & Co. KG is not liable for the work of the responsible person (or inspection company) who carries out the inspection. This person always works on his own responsibility!

If there is any doubt as to whether the check has been carried out correctly or whether the glider is airworthy, contact the manufacturer.

18.1. Inspection scope

- In Germany, air sports equipment is subject to inspection in accordance with LuftGerPV §13/2:
"The airworthiness of the air sports equipment according to § 1 paragraph 4 of the air traffic licensing regulations must be checked by the owner or on his behalf according to the manufacturer's instructions.
The owner is responsible for the timely and complete performance of the inspections.
He shall immediately notify the manufacturer of any defect in the aircraft or in the test instructions".
- The inspections may be carried out by the manufacturer, by persons appointed by the manufacturer or by a person with sufficient expertise who meets the minimum personnel requirements specified in 18.3.
- In Germany, according to LuftGerPV §13/2, it is possible for the owner to inspect his aircraft himself. This is not recommended by the manufacturer. In most cases the owner does not have the necessary personnel and technical equipment (expertise, measuring instruments, etc.).
- If the inspection reveals a defect, the glider must not be flown again. Repairs must be carried out by the manufacturer or a person authorised by the manufacturer.

18.2. Inspection intervals

The interval for training paragliders and commercial tandem paragliders is every 12 months, for all other paragliders every 24 months or after 100 hours of use, whichever is the sooner.

A line measurement should be carried out every 20 hours of flight and compared with the specification.

18.3. Personnel requirements for the inspection

Personnel requirements for the inspection of paragliders used only for personal and single seater paragliders:

- A valid unrestricted paragliding pilot's licence or an equivalent approved licence.
- Sufficient knowledge of the paraglider to be inspected (e.g. type specific training provided by the manufacturer or importer).

Personnel requirements for the inspection of paragliders used by third parties and for two-seater paragliders:

- Sufficient expertise to inspect paragliders. This should be evidenced by at least one of the following:
- Professional training conducive to this inspection activity
- Two years' professional experience in the manufacture or maintenance of paragliders and hang-gliders, or a technically similar activity.
- Sufficient type-specific training (e.g. manufacturer/importer training).

18.4. Necessary documents

- Current version of the inspection instructions
- Data sheets
- Previous inspection reports (only for further inspections)



- Maintenance and calibration documents for the measuring instruments
- manufacturer's corrective action instructions
- Airworthiness directive if applicable

18.5. Test equipment

The test equipment to be used for the individual test shall be the equipment listed below:

- Air permeability measuring device (porosimeter): JDC or equivalent
- Length measuring device: steel tape or laser measuring device
- Strength measuring device for lines according to EN926/1, 4.6.3: electronic measurement with minimum 100Hz sampling rate, load application speed between 0.7m/min and 1m/min.
- Fabric strength measuring device for canopy: Bettsometer, B.M.A. GB 2270768

All measuring equipment must be calibrated and serviced regularly in accordance with the manufacturer's instructions.

18.6. Test procedures

Identification of the equipment:

-
- On delivery of the paraglider, an initial inspection is carried out and the paraglider is identified using the official manufacturer's documentation.
- Check that the type label and inscriptions are correct, complete and readable.

Visual inspection of the canopy:

- The upper and lower surfaces, leading edge, trailing edge, ribs (including any V-ribs), cell partitions, seams, flares and line loops are inspected for cracks, shearing, stretching, damage to the coating, repairs and any other abnormalities. The inspection result shall be recorded in the inspection report.
- In the case of tears in the seams and other damage, repairs must only be carried out using original spare parts and original seam patterns, no gluing of large tears with adhesive sail, use of non-original spare parts, etc.

Visual inspection of the lines:

- If the lines are damaged (seams, tears, folds, coating, chafing, thickening, core exits, etc.), they must be replaced immediately with original spare parts and original seam patterns.

Visual inspection of the connecting parts

- All line shackles, trimmers and speed systems should be inspected for any signs of damage, such as tears, chafing or stiffness. Both risers shall be inspected for shear points, tears and heavy wear.

Measurement of line lengths/risers:

- The individual lines are laid out and loaded with 5 daN. The measurement is carried out from the suspension point of the riser to the canopy including the suspension line loop. The total line lengths determined are documented in the inspection report and compared with the set line lengths. Compliance with the tolerances specified in the manufacturer's instructions must be documented in the inspection report.
- Total lengths must not deviate by more than +/- 10 mm from the nominal values. The determined values must not represent a significant trim shift.
- For example, a trim shift is present when



- o More than 50% of the lines reach the tolerance limit, where the tolerance limit only deviates in either the + or - direction. (Example: A/B lines are 10 mm longer, while C/D lines are on target)
- o or 25% of the lines deviate from the tolerance limits in both directions (+ and -) (Example: The A/B lines are 5-10 mm longer, while the C/D lines are 5-10 mm shorter than the set values (typical "backward" trim shift due to aging).
- In the event of a trim shift, individual lines can be corrected by looping in or out to restore the correct condition (e.g. by looping in A-lines that are too long or looping out C-lines that are too short at the line lock). Once the correct trim condition has been restored, the absolute total lengths must not deviate by more than +/- 30 mm from the set values.
- Both risers shall be measured under a load of 5 daN. The measured values shall be compared with the specifications in the data sheet and recorded in the test report. A maximum difference of +/- 5 mm is allowed in the length of the risers.

Control of line strength:

- The proof of line strength must be documented in the same way as required by EN926/1: 2016 or LTF 2-565-20 for the type test:

For the Skyman Tandem 39, the lines are made from high strength Dyneema and Aramide from Edelrid and Liros. This means that a breakage test after the first 24 months can be omitted if the paraglider is in good overall condition in favour of uniform length ageing.

- Main line: From each line level (A, B, C, D) one main line is removed from the centre of the canopy and the breaking load is determined using the strength measuring device. The lines removed must be identified in the inspection report. This is important so that the line that was replaced in the previous test is not tested in a subsequent retest. During further retests the main lines on the opposite side or next to the centre main line are tested (i.e. AR2, CR2).
- Top lines/middle line level: Above the main lines an additional line is removed up to the canopy and the breaking load is also determined. If the determined breaking load of the A line is 1.5 times the nominal value (e.g. nominal value 50 daN, determined breaking load >75 daN), no further lines need to be tested on the B/C/D levels.
- Limit values of the individual lines for the Skyman Tandem 39 (The installation locations are shown under 16.2:)

Line article	Limit (daN)
TSL-500	213
7343-420	162
7343-340	134
7343-190	84
8000-280	105

Line article	Limit (daN)
8000-230	95
8000-190	85
8000-135	61
8000-090	38

Inspection of the canopy strength::

- Canopy strength is tested using the Bettsometer (B.M.A.A. approved Patent No. GB 2270768 Clive Betts Sales). In this test, a needle-thick hole is made in the upper and lower sails in the area of the A-line attachment and the fabric is tested for tear resistance. The limit of the measurement is set at 400g and a tear length of 5mm.
- The exact test procedure is given in the operating instructions for the Bettsometer. The measured value is recorded in the test report.



Inspection of the air permeability of the cloth:

- Porosity is measured at a minimum of 5 points using a suitable porosimeter. The measuring points are distributed across the wing span approximately 20-30 cm behind the leading edge. At least 2 measuring points must be in the middle third of the canopy. The values obtained shall be recorded in the test report.
- Limits: No measuring point should be less than 15 seconds. If a measurement is less than 15 seconds, the glider is no longer airworthy.
-

Visual Inspection of Trim and Adjustment:

- All lines should be checked against the line plan to ensure that they are correctly configured up to the riser and that all line levels are clear.

Checkflight:

- A check flight is only necessary after major repairs.
- The purpose of the check flight is to determine whether the flying characteristics of the glider have changed compared to a brand new glider.
- The inspector must have the flying skills and experience to be able to compare the design specifications with the flying behaviour of the paraglider being inspected and to identify any changes in performance. This includes in particular:
- He must also be familiar with the design regulations in force at the time of certification.
- A check flight must cover at least the following points: pull-up behaviour, stall tendency (B-stall recovery), tendency to make negative turns, control travel, >50% one-sided collapses.
- If the glider does not behave correctly in any way, it must not be flown and must be returned to the manufacturer for inspection. Under no circumstances should you attempt to remedy the fault yourself.

18.7. Documentation

- All test results and details of the paraglider (type, size, serial number, year of manufacture) must be recorded in the inspection report. A sample report is available from the manufacturer.
- Repairs and maintenance are also recorded in the inspection report.
- The overall condition of the appliance is indicated according to the options to be ticked in the inspection report. All measured values such as strength, porosity, etc. are included in the overall condition.
- In the event of a negative test result, the manufacturer must be contacted to agree on further action (e.g. return of the unit to the manufacturer for repair).
- Any unusual defects must be reported to the manufacturer immediately!
- The inspection is marked on the unit next to the type label. This note must contain at least the time of the next inspection, place, date, signature and name of the inspector.
- All inspection documents (inspection report and measurement report) must be produced in triplicate. The owner of the equipment, the inspector and the manufacturer shall each receive one copy (the copy shall be sent without delay). The retention period for inspection records is 6 years.