

XCitor X-Wing Evo

Owner's Manual
Service Booklet

Version 2.0

Date: 03.10.2013



© Fresh Breeze GmbH

Fresh Breeze GmbH works continuously to develop and further improve all models. You will appreciate that we must therefore reserve the right to alter any part of the model and its equipment or technical specifications at any time. No legal commitment can therefore be implied by the information, illustrations or descriptions in this Manual.

You should therefore regularly visit our website: www.fresh-breeze.de

There you will find additional information relating to your model and any changes to the Manual. The date and version number of the Manual are given on the first page.

Express written consent from Fresh Breeze GmbH is required for any duplication of this Manual, in whole or in part (with the exception of short quotations in specialist articles), and in any form or by any means, whether it be electronic or mechanical.

No claim arises to the product descriptions, common or trade names or other intellectual property by virtue of the fact that this Manual has been made available.



WARNING

This paratrike must be used within the limits and according to the instructions in this manual. The manual must be on board during flying.

Read manual before first flight!

Foreword

Thank you for choosing the XCitor.

The XCitor combines the latest technology with numerous features for your enjoyment and safety and convenience. To help you get the best out of these features in everyday use, we recommend that you read this Manual carefully so you can quickly become familiar with your paratrike in detail.

As well as information on how to use the controls and equipment, the Owner's Manual contains important notes on care and maintenance. These are relevant to your safety and will help preserve your paratrike's value. The Manual also offers useful flying tips and advice, together with some suggestions on how to fly your paratrike.

In addition to this Owner's Manual, the Service Booklet also includes the Service Schedule for your paratrike. It contains important information on Fresh Breeze service requirements and lists the trike's fuel consumption figures.

Should you have any further questions regarding your XCitor or if you suspect that your owner's literature is not complete, please contact your Fresh Breeze dealer or importer. They are always glad to answer your queries and note any suggestions you may have.

We wish you safe and enjoyable flying with your XCitor.

Fresh Breeze GmbH

Contents

NOTES ON THIS OWNER'S MANUAL.....	9
MANUAL.....	9
FRESH BREEZE AND THE ENVIRONMENT	9
<i>Respect for nature and the environment</i>	10
<i>Environmentally-friendly recycling</i>	10
XCITOR.....	11
01 TECHNICAL EXPLANATION	11
GENERAL LAYOUT.....	11
<i>Features</i>	11
TECHNICAL DATA.....	12
PERFORMANCE DATA	12
<i>Air speed</i>	12
<i>Take off distance</i>	12
<i>Landing distance</i>	12
<i>Climb rate</i>	12
<i>Range</i>	12
<i>Cross wind</i>	12
<i>Noise</i>	12
<i>Tire pressure</i>	12
<i>Maximum altitude</i>	13
<i>Screw tightening torque</i>	13
OPERATION LIMITS.....	13
<i>Permitted Maneuvers</i>	13
<i>Air speed</i>	13
ENGINE	13
<i>Fuel</i>	14
<i>Engine Operation</i>	14
<i>Engine instrumentation</i>	14
WEIGHT, CENTER OF GRAVITY.....	14

02 STANDARD PROCEDURES.....	15
SET UP AND TEAR DOWN FOR TRANSPORTATION AND FLYING	15
<i>Safety issues for ground transportation.....</i>	15
DAILY INSPECTION	15
<i>Check prior to flight.....</i>	16
<i>Engine</i>	16
MAINTENANCE AND CARE	17
PERIODICAL CHECKS.....	17
<i>Every 25 hours.....</i>	17
<i>Every 100 hours.....</i>	17
<i>Every 2 years</i>	17
OBLIGATION OF REGULAR CHECKS.....	17
STANDARD PROCEDURES, CHECKLISTS, ENGINE START	18
<i>On the panel.....</i>	19
<i>Beside the panel.....</i>	19
<i>Engine start procedure.....</i>	20
<i>Rolling on the ground.....</i>	20
<i>Take off and climb.....</i>	20
<i>Cruise</i>	21
<i>Landing.....</i>	21
<i>Engine shut off</i>	21
<i>Checklist prior to start.....</i>	21
FLIGHTS UNDER SPECIAL CONDITIONS	22
<i>Rain</i>	22
<i>Wind.....</i>	22
<i>In flight turbulences</i>	22
<i>Flights in snowy conditions</i>	22
<i>Extreme temperatures</i>	22
SPECIAL REMARKS	23
03 EMERGENCY PROCEDURES	24
ENGINE FAILURE	24
ENGINE START DURING FLIGHT	24
SMOKE OR FIRE ON BOARD	24
FLYING WITH THE ENGINE SHUT OFF	25
FORCED LANDINGS	25
LOSS OF DIRECTIONAL CONTROL	25

X-WING EVO	26
04 SAFETY	26
SAFETY NOTICES.....	26
DISCLAIMER, EXCLUSION OF LIABILITY AND OPERATING LIMITS	26
FOR YOUR SAFETY	27
TYPES OF USE	28
<i>Winch launch</i>	28
<i>Aerobatics</i>	28
05 X-WING EVO FEATURES	29
DESCRIPTION	29
SUSPENSION SYSTEM	29
TECHNICAL DATA.....	30
06 SETTING UP THE X-WING EVO AND TEST-FLYING	31
BEFORE THE FIRST FLIGHT	31
ADJUSTING THE MAIN BRAKE LINES	31
FIRST FLIGHT	33
07 FLYING THE X-WING EVO	34
PRE-FLIGHT CHECK AND LAYING OUT THE PARAGLIDER	34
6-POINT CHECK.....	34
USE OF THE TRIM SYSTEM	35
TAKE OFF, CRUISE AND LANDING	36
FLYING UNDER TURBULENT CONDITIONS	36
LANDING WITH ENGINE SHUT OFF.....	37
LANDING WITH HELP OF ENGINE	37
NORMAL FLIGHT	37
RAPID DESCENTS	37
<i>Spiral dive</i>	38
08 DANGEROUS SITUATIONS AND EXTREME FLYING.....	39
DANGEROUS SITUATIONS.....	39
<i>Safety training</i>	39
<i>Material stress and damage</i>	39
COLLAPSING THE PARAGLIDER.....	39
<i>Asymmetric collapse</i>	39
<i>Asymmetric collapse with tangling</i>	40
<i>Front stall</i>	40
TYPES OF STALL.....	41

<i>Deep stall</i>	41
<i>Full stall</i>	41
<i>Spin</i>	42
OTHER TIPS FOR DANGEROUS SITUATIONS	42
<i>Deep stall in rain</i>	42
<i>Advertising and adhesives</i>	43
<i>Overloading</i>	43
<i>Sand and salt air</i>	43
<i>Temperature range</i>	43
09 STORING AND LOOKING AFTER THE PARAGLIDER.....	44
STORING THE PARAGLIDER	44
<i>Packing the paraglider</i>	44
<i>Storing and transporting the glider</i>	45
LOOKING AFTER THE PARAGLIDER	45
<i>Fabric</i>	45
<i>Lines</i>	46
<i>Rigid construction</i>	46
<i>Cleaning</i>	47
10 REPAIRS AND INSPECTIONS	48
TYPE DESIGNATION	48
REPAIRS	48
<i>Fresh Breeze workshops</i>	48
<i>Small repairs to the glider</i>	48
REGULAR INSPECTIONS	48
<i>Lines</i>	48
INSPECTION	49
<i>General</i>	49
<i>Inspection periods</i>	49
<i>Validity of inspection</i>	49
<i>Inspection by the pilot</i>	49
11 APPENDIX.....	50
FRESH BREEZE WEBSITE	50
<i>Product registration</i>	50
ADDRESSES	50
OWNER'S MANUAL VERSIONS	51
<i>Version 2.0</i>	51

MAINTENANCE AND SERVICE BOOKLET	52
REPAIRS	52
LOCATION OF SIGNBOARDS AND FRAME NUMBER	52
12 X-WING EVO.....	53
GLIDER DETAILS	53
PILOT DETAILS / PROOF OF OWNERSHIP.....	53
X-WING EVO – INSPECTIONS AND REPAIRS OVERVIEW	54
LINE LAYOUT.....	55
MATERIAL LIST	56
LOAD AND SHOCK TEST REPORT	57
13 XCITOR.....	58
WEIGHT AND BALANCE.....	58
<i>Procedure</i>	58
WEIGHT AND BALANCE SHEET	59
EQUIPMENT LIST	60
XCITOR TRIKE – MAINTENANCE OVERVIEW	61

Notes on this Owner's Manual

Manual

This Owner's Manual contains important information, tips, suggestions and warnings. We recommend that you familiarise yourself with your new paratrike by reading this Manual before your first flight. This will allow you to acquaint yourself its new functions, to learn the best way to fly the paratriker in various situations, and explain how to get the best out of your XCitor.

The Manual complies with the airworthiness requirements in LTF NFL II 91/09 and forms part of the certification.

Please ensure that this Owner's Manual is always available to anyone else flying the XCitor, i.e. anyone renting, borrowing or buying the model from you.

This manual describes **the equipment available for the XCitor at the time of going to print**. Some of the equipment described here will not be available until a later date, or may only be available in certain markets.

Some sections of this Owner's Manual do not apply to all models. If this is the case, a text at the start of the section indicates which models it applies to.

Illustrations are intended as a general guide, and may vary from the equipment fitted in your XCitor in some details.

At the beginning of this Owner's Manual, you will find a **table of contents** showing all the items described in this manual in the order in which they appear.

All references to **positions** such as "left", "right", "front" or "rear" are given as seen facing in the direction of travel.

* optional equipment

➔ The section is continued on the following page.

■ Denotes the end of a section.

® Registered trademarks are marked ®. However, the absence of this symbol does not constitute a waiver of the rights concerning any proprietary name.

⇒ ⚠ Refers to a "WARNING" within the same section. If the WARNING symbol is followed by a page number the warning text referred to is included in a different section.



WARNING

Texts with this symbol contain safety information. They warn you of serious dangers, possibly involving accident or injury.



Caution

Texts with this symbol draw your attention to a possible risk of damage to your paratrike.



Note

Texts with this symbol contain additional information of a more general nature.

Fresh Breeze and the environment

Protection of the environment, safety and quality are the three basic values of Fresh Breeze GmbH and these have implications on everything we do. We also believe that our customers share our environmental awareness.

Respect for nature and the environment

You can easily play a part in protection of the environment by practising our sport in such a way that there is no damage to nature and the areas in which we fly. Take your rubbish away with you, refrain from making unnecessary noise and respect the sensitive biological equilibrium of nature. Consideration for nature is required even at the launch site!

Flying a paratrike is, of course, an outdoor sport – protect and preserve our planet's resources.

Environmentally-friendly recycling

Fresh Breeze gives consideration to the entire life cycle of its paratrikes, the last stage of which is recycling in an environmentally-friendly manner. The synthetic materials used in a paraglider must be disposed of properly. If you are not able to arrange appropriate disposal, Fresh Breeze will be happy to recycle the paraglider for you. Send the glider with a short note to this effect to the address given in the Appendix. ■

XCitor

01 Technical Explanation

General layout

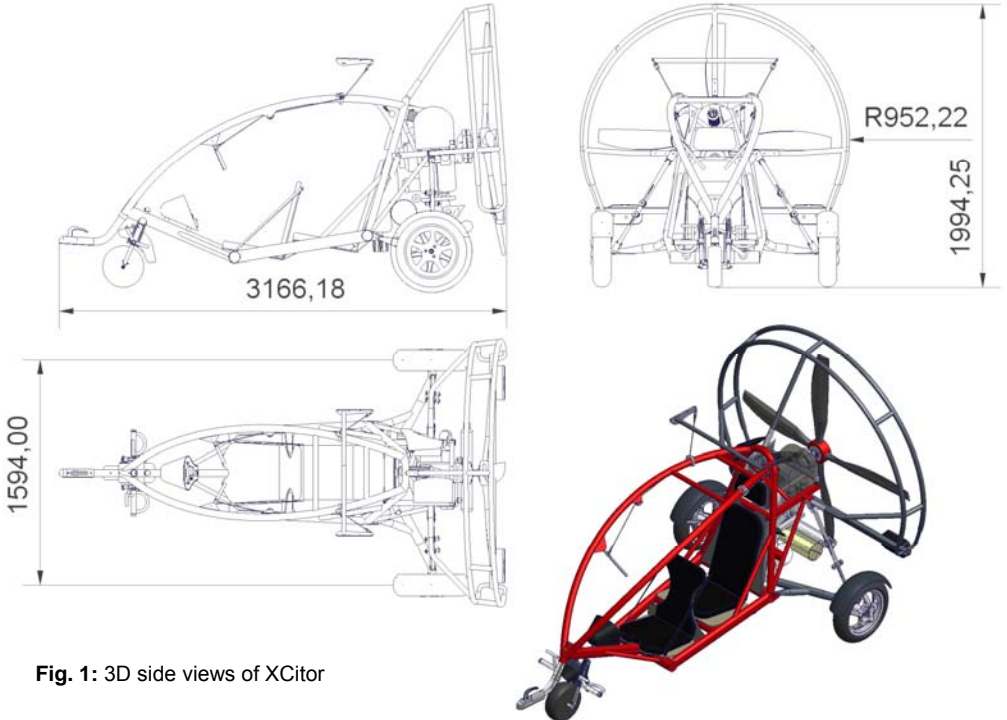


Fig. 1: 3D side views of XCitor

Features

- Paratrike with steerable front wheel
- Frame made of T.I.G. welded aluminium tube
- Tandem seater
- Springy landing gear, 150 mm travel, cable operated front brake
- Two stroke in-line engine Hirth 3503 with electric ignition, motor management and electronic injection system
- Four-blade propeller 1665 mm, Type HTC CCQW-3B-167,5-CG 4 Blade
- Paraglider: technical description see X-Wing Evo section

Technical data

Length	3,17m
Height	2,00m
Width	1,91m
Empty weight	168kg
Payload	200 kg
Take off-weight (max.)	383 kg
Fuel capacity	28 L

Performance data

The following figures were achieved in flight tests. They are based on a good general shape of the trike, the wing and the engine and that the pilot has an average skills.

They are valid under standard conditions (mean sea level, standard pressure, 15°C, no wind, maximum take off weight 383 kg, even runway with short grass in a good shape). Higher altitude, higher temperatures and lower air pressure reduce those performance figures.

Air speed

Minimum speed	30 km/h
Manoeuvre speed	65 km/h
Permitted maximum speed	73 km/h

Take off distance

Take off distance	20-150 m (depends on load and wind speed)
Take off distance about a 15m obstacle	200m

Landing distance

Landing distance	10 - 30 m with brakes
Landing distance about a 15m obstacle	150 m

Climb rate

single	4,0 m/sec
tandem	2,5 m/sec

Range

The range is depending on the fuel consumption, which is much higher at higher air speeds.

The best consumption can be achieved flying slightly faster than the best gliding speed. This gives a range of ca. 200 km at an air speed of 65 km/h.

Cross wind

The maximum allowed cross wind component during take off and landing is 8 km/h.

Noise

The XCitor fulfils the German noise requirements for ultralight paratrikes which means that it is quieter than 60 dB(A) flying in 150 m altitude.

Tire pressure

Rear wheels	2,0Bar
Front wheel	1,5 Bar

Maximum altitude

The maximum altitude depends on the load and temperature. It is defined by a climb rate smaller than 0.5 m/sec. This height is roughly 3000 m.

Screw tightening torque

Propeller HTC CCQW-3B-166,5-CG 4-Blade	24 Nm for M8
--	--------------

Operation Limits

This chapter contains information about the operational limits for the safe use of the XCitor. These data are the result of flight tests as well as of theoretical calculations.

Beside this limits check also carefully the limits of the X-Wing Evo in Section 04 Safety

Flying under icing conditions are not permitted.

No flying under squally wind conditions or at high wind speeds of more than 20 km/h (=5,6 m/sec), or if rain comes up.

Permitted Maneuvers

The XCitor is designed for safe loads between + 4 G maximum and + 0,5 G minimum load.



WARNING

The XCitor is – as any other ultralight airplane – not certified for aerobatics.

Any aerobatic manoeuvres as wells as roll angles of more than 60° during e.g. curves or spirals are NOT PERMITTED!

Air speed

The given values are standing for the Indicated Air Speed (IAS), referring to the air speed sensor located in the front section of the trike.

Max. allowed speed	73 km/h
Max. travel speed	70 km/h
Maneuver speed	65 km/h
Min. recommended approach speed	40 km/h
Minimum speed	35 km/h

The maximum allowed speed must not be exceeded. Full brake use is only permitted until the maximum maneuver speed. If you are faster don't apply the brake too fast or completely.

Engine

Manufacturer	Hirth
Type	3503
Takeoff power	70 PS @ 6200 U-1
Constant power	65 PS @ 6000 U-1
Cylinder head temperature	max. 110°C
Propeller	HTC CCQW-3B-166,5-CGt
Blade angle	24° bei 75% (= 625mm radius)



WARNING

Don't use the engine without propeller with more than idle speed. Otherwise the engine might be destroyed due too high rpm.

Fuel

The engine is operated with 2-stroke-mix 1:100. The engine maker recommends unleaded 95 ROZ or more. For a short time AVGAS 100LL or MOGAS can be used as well. Under very hot conditions the use of AVGAS is better as the risk of steam bubbles is less.

The 2-stroke-oil should be a high-quality synthetic oil (at least API: TC res. Jaso FC or ISO EGD).

As an alternative BlueMax-2stroke oil 1:100 may be used as well.



WARNING

Never use fuel without oil! Use fresh, clean and water free fuel.

Engine Operation

Engine start procedure: Move the main switch to the upper „on“ position. Now the fuel pump is running.

Start the engine by pressing the red push button or by using the pull starter on the right side of the engine. If the engine is cold the injection system can be activated (you can hear it for ca. 0.5 sec) with the gas pedal. Also if the engine is cold the gas pedal should be pressed down a little bit (but not that much that the injection system is running again).

Shutdown: Just move the main switch to the lower “off” position.

The 2-stroke engine needs no warm up – once if it running full power may be applied at any time.

Engine instrumentation

The following figures must not be exceeded:

Value	Range	Max.	Unit
Rev. per minute	0-9999	6200	Rpm
Water temperature	40-120	110	°C
EGT (Exhaust Gas Temp.)	100-800	700	°C

Weight, center of gravity

The maximum legal take off weight of the XCitor is 383 kg including pilots, fuel and luggage. If any equipment is added afterwards the payload must be reduced accordingly. The pilot is responsible to maintain these limits.

Maximum take off weight	383 kg
-------------------------	--------

The allowed range of the center of gravity (CG) must not be exceeded.

If only one person is flying the XCitor the front seat must be used. The pilot weight must be more than 45 and less than 100 kg.

The rear seat may be loaded with minimum 0 and maximum 100 kg.

The CG must be located somewhere between 50 mm in front of the paraglider attachment and 50 mm aft this attachment point (refer to chapter 11, weight and balance).

This is important to keep the nod angle of the trike in the correct range with a maximum of $\pm 10^\circ$, measured between ground and the upper side of the engine mount. ■

02 Standard procedures

This chapter contains checklists and procedures for standard use.

Set up and tear down for transportation and flying

This is how to prepare the XCitor for flying, if it was hauled to the airfield:

1. Remove the cable tree from the car and take the XCitor of the trailer clutch
2. Remove tarpaulin and propeller protectors.
3. Remove the cable tree from the XCitor, remove the light bar, stow both things outside the trike.
4. Take the wing out of the trike, put it beside it, take it out of its stuff bag.
5. Lay it as usually behind the trike, upside down, trailing edge showing to the XCitor.
6. Check the way of all lines from the attachment point at the trike to the wing. Put the lines between prop cage and cable binder. Pull the trike forward to straighten and tighten the lines (never drive with speed into the canopy).
7. Move the trim levers into a vertical position, don't start in an accelerated configuration. Trim levers should therefore never be in their rear position!

Tear down happens in the opposite order. You are not allowed to trailer the trike faster than 80 km/h. The towing vehicle must have a minimum permissible drawbar load of 25 kg.

Road transportation is only permitted with tarpaulin and propeller protectors.

Safety issues for ground transportation

Prior to towing on public roads a safety check has to be carried out. This check is similar to the pre-flight check procedure.

In particular the main frame has to be checked for cracks, especially in the area of the coupling tube.

The rear axles must be checked as well, the safety wire on the central wheel screw, the rear rims, and the three wheel bolts on each side.

In case of a hard landing the rims could be deformed slightly, causing the wheel bolts to settle and to become loose.

The tire pressure must be between 2 and 2.5 bar

Daily inspection

We want to point out that nearly all technical defects can be recognized early enough during a conscientious and precise preflight-check.

Therefore we ask you to do the check in a correct manner in your own interest. Flight safety depends mainly on correct checks and maintenance procedures.

1. Engine: Check for any leakage, loose screws, cracks etc.
2. Propeller: Check correct sit, tight screws and for damage.
3. Check oil and cooling agent level. The oil level of the gear box must be in height of the little gauge glass. Use gear oil SAE 80 GL 4 or GL5. Cooling agent must be visible in the transparent expansion bottle.
4. Check the gear box, the cooling system and the fuel system for any leakage. Especially check the tube connections.



5. Check the electrical connectors, the spark plug socket, the gas cables and the bowden cable distributor for a tight sit and mechanical integrity.
6. If your XCitor is equipped with an additional gas pedal for teaching purpose. Make sure that this gas pedal is not locked and at its idle position.



Caution

The main switch must be shut off. A trained person must be in the pilot seat.



Note

It is not possible to crank the engine via the propeller as there is a centrifugal clutch in between. If the motor shall be turned by hand use the pull starter.

7. Check the paraglider: No dangled or damaged lines.
No visible damages at the canopy, no tears or stretched areas.
8. The attachment points of the wing should be firmly clamped to the bent main tubes of the XCitor frame.
9. Check the suspension system and the wheels for any damage, especially the bungee cords for abrasion and any cuts.
10. Check of the front brake
11. Check both trim levers: They must be moveable with a given friction resistance (5-7 kg).
12. Pedals and bowden cables freely movable.
13. Does the gas pedal return to its idle position, when unloaded? Therefore you make check the gap between the idle setting screw and the bowden cable segment under the left side of the longitudinal engine mount.

14. Check the seat board and the belts for tightness, correct sit and damage
15. Tires: Check for damage and correct air pressure (1,8-2,5 bar rear & front)
16. Main gear: Check rubber bearings, screws, alu fittings for wear and tear
17. Lift off the front wheel, check if it can be turned freely

Check prior to flight

Prior to any flight the responsible pilot has to carry out a visual inspection.

The pilot learns the necessary knowledge during his flight training and during a special briefing for the XCitor, done by the dealer or flight school who sells the trike.

Check especially the following points:

Engine

- Propeller for correct sit, tight screws and any damage
- Manual engine cranking via pull starter, check for free movement and unusual noise.
- Muffler and exhaust system, connection springs for tight sit.
- Cooling agent must be visible in the transparent expansion bottle.



Caution

When the motor is turned by hand for check purpose the main switch must be switched off! A trained person should be in the pilot seat of the XCitor. If nobody else is available: Double check very carefully the correct stop position (lower position) of the main switch!

Put your left leg in front of the right rear wheel so that the trike cannot start to roll when pulling the starter rope!

Maintenance and care

Keep the XCitor and it's wing clean and dry. Don't use any aggressive solvents.

Use grease or engine oil wherever metal slides over metal (rear suspension struts).

Never use grease or oil between metal and plastic (front struts): The plastic will swell!

Use there silicone based lubricants instead. Never use grease or oil or something similar on the upper bearing of the trim levers. The bearing screw must be tightened so much that 5-7 kg must be applied until the lever starts to move.

Periodical checks

Every 25 hours

- Visible inspection of all screws
- Play and the free movement of any moveable parts like wheels, suspension system, trim levers etc.
- Lubrication of those parts:
Metal to Metal: grease or engine oil,
Metal to plastic: silicone spray
- Friction force in the trim lever bearing:
The correct force to move the lever should be 5-7 kg at the handle.
- Front brake
- Gear oil level (glass gauge)
- All bowden cables
- All belts, belt buckles, guide rollers
- Optical check of all weld seams for any cracks
- All rubber-metal-joints for cracks
- Cooling agent level
- Tension check of the water pump tension
- Tightness check of the cooling system (leakage, water loss)

Every 100 hours

Same as 25h-Check, plus:

- Spark plug change (Denso W24FSR or equal)
- Gear oil change, gear oil according to SAE 80 API GL4 or 5

Every 2 years

Same as 100h-check, plus:

- Cooling agent change, water with cooling additive (protection against freezing and corrosion)
- Change of the water pump belt if there is visible tear or damage
- Replacement of all damaged or torn parts

The Hirth-2-stroke-engine requires no oil change (beside the gear). Every 600 hours we recommend a general overhaul at its maker Hirth.

The ballistic recovery system requires a special maintenance according to the additional manual.

Obligation of regular checks

In Germany this trike must be checked once a year. This check must be carried out by a class 5 inspector. A list of certified inspectors can be retrieved from the "DULV e.V." (German Ultralight Association).

The canopy is subject of this check as well. The inspector may decide if the wing has to be checked by its manufacturer or not (typically every 2 years)

Standard procedures, checklists, engine start

Whenever the engine is started somebody has to be in the front seat, being able to operate the cockpit.

The picture below shows the position and the purpose for the individual elements of the cockpit.



Fig. 2: 3D of XCitor cockpit

The following tables describes the functions of these elements:

On the panel

Name	Number	Positions	Purpose
Main Switch	1	ON OFF	Main switch for the electrical system including ignition
Interkom	2	Refer to its separate manual	For communication and radio
Water temperature	4	Between 80 and 105°C	Water temperature monitoring
RPM	5	In cruise between 4200 and 5000 rpm	Display of motor rpm
Start switch	6	Un- /pressed	Press to start engine
Charging check light	7	Red light	When electrical system on and red light off then battery will be charged correctly

(Equipment may vary depending on the version)

Beside the panel

Name	Positions	Purpose
Gas pedal	Up / down	Giving gas with the right foot
Brake pedal	Up / down	Braking of the front wheel with the left foot
Trim lever	Fore / aft	Works like the brake line: In order to fly faster pull both levers aft, for curve flying push inner lever fore
Cruise gas lever	Fore / aft	Used for gas setting during cruise. With the gas pedal only more gas than set with the cruise gas can be applied, never less!
Control (brake) lines	(not) pulled down	Used to steer the canopy especially during take off, landing and under turbulent conditions

Engine start procedure

Main Switch	ON. Charge light on.
Gas pedal	Cold engine: kick pedal 50&down until fuel is injected for ca. ½ sec. Can be heard. Then don't give any gas at all.
	Warm engine: Kick pedal slightly down, ca. 10%.
Cruise gas lever	During engine start this lever MUST be at IDLE.
Propeller	Danger zone free.
Brake pedal	Kick down and hold.
Electric starter	Press starter push button until the engine starts gets alive. If necessary give a little bit gas.

Rolling on the ground

Get used to the XCitor's ground behaviour by roll tests on the ground. Do that in any case before attempting to fly. Ground control is achieved via the foot steerable front wheel. In the air it is controlled via the canopy, either with the trim levers or the brake lines. During take off the XCitor steering and the X-Wing Evo steering must be properly coordinated.

Take off and climb

Whenever it is possible take off directly against the wind. The maximum permitted side wind vector is 8 km/h. Lay the X-Wing Evo behind the XCitor, upside down, trailing edge towards the trike. Put the lines into the holders (cable binders) beside the cage. Check all lines for any tangles and knots and being parallel.

Get into the XCitor, fasten seat belts, tighten them.



Caution

The rear seat has 3 belt buckles! All 3 must be closed prior to start! Not closing the buckles on both sides will cause the front seat to move forward when the front belt is loaded! So the front belt cannot hold without the rear buckles being closed!

Move the trim levers into a vertical position. Check their bearing for being not to loose (the friction force to move the handles – measured at the handles) must be between 5-8 kg!).

Check wind direction and that the glider is laying correctly behind the XCitor.

Take the brake lines into your hands.

Start the engine (see the corresponding chapter).

Open the foot brake.

Increase rpm until the glider can be pulled up (depending on the wind: ca. 50% of the maximum power)

Keep the rolling direction with your feet.

As soon as the canopy comes up steer it active with the brake lines and keep it centred behind and above the XCitor. Prevent the X-Wing Evo from shooting over by applying some brake. Stabilize the glider above the trike. Keep on rolling.

Check the position of the canopy. If necessary steer the XCitor to the side and drive under the canopy, if the wing is pulling too much to the side.

If the glider is centred over the trike and everything under control apply more gas (full, if flying tandem). The XCitor will very soon take off.

Flying solo control the power carefully and reduce gas slightly after the take off:



**Caution**

The XCitor has much excessive power for solo flights and may push you into a quite steep flight position, which you may not be used to!

Cruise

Even during climb you may trim the XCitor to a straight flight with the trim levers. Just push the lever on the side you want to move to slightly forward. Remember, the brake levers act like a brake line – pushing them forward makes the XCitor move into that direction. Vice versa the other lever may be pulled back.

Under normal flight conditions the brake lines may be just set free so that the trim levers can be operated easily.

The trike can be accelerated by pulling both trim levers back at the same time. This is like opening the brake lines.

If due to the torque of the propeller the trike flies a curve just push the right lever forward until the XCitor flies straight (the left side is loaded more than the right, causing the right trike side hanging down slightly more than the left: therefore the trike wants to fly to the left side).

Cruise speed is between 45 and 75 km/h depending on the rpm setting between 4200 and 5000 and on the trim setting and the total weight.

The most economical speed is roughly 65 km/h depending on the load.

The maximum allowed speed (VNE) is 73 km/h and must never be exceeded.

Under turbulent conditions the XCitor is not allowed to fly faster than 65 km/h (manoeuvre speed VA).

The fuel consumption is somewhere between 8l/h at low speeds (55 km/h) up to roughly 10l/h at 70 km/h.

Landing

Any landing has to be made against the wind.

Reduce power and push both trim levers into a slow position (vertical or a little bit slower).

Take both brake lines into the hands, but don't brake yet. Start to tighten the brake lines in 5-8 m height. Flare out, starting at 1-2m, with continuously applying more brake. If you made a perfect landing you should just apply full brake if you touch the ground. If you flared out being too high support the descent with gas.

Being on the ground you may open the brake lines again, wind them 1-2 times around your hand, and brake again to make the glider falling down behind the trike. If it is windy you may repeat this procedure.

If the wind is quite strong apply the front brake carefully, so that the glider can move with the wind backwards and fall down.

Engine shut off

- Gas pedal up to idle.
- Main switch off.

Leave the trike only after the propeller has come to a complete stop as it may run longer than the engine due to the centrifugal clutch.

Checklist prior to start

- Canopy laid out properly?
- Lines straight and in parallel?
- lines clipped into the cable binder at the cage side?
- Trim levers in a vertical position, and clamped tight enough (5-7 kg)?
- Cruise gas lever (and the teacher gas pedal, if any) at idle position? →

- Enough fuel on board?
- Seat belts fastened?
- Helmet?
- Prop free?
- Wind not too strong and from ahead?
- Brake lines close at hand?

Flights under special conditions

Rain

Basically each conscientiously done flight planning contains a weather check. So in principle no flights under rainy conditions should become necessary. Anyway, every pilot may get into unforeseeable worse weather conditions.

If the rain is only very light, the flight may be continued for a certain time. But the wet canopy will get heavier. Therefore flight speed will increase, causing a higher stall speed as well.

With a wet wing fly carefully, avoid sudden manoeuvres, and don't be too slow when landing.

If the rain gets stronger land! No flights in strong rain!

Never stow a wet canopy away. It will deteriorate. A wet canopy will also come up during take off much slower and worse.

Wind

In general every take off and every landing has to be made against the wind. Move always the X-Wing Evo into the wind. If the XCitor has to be rolled against the wind at an angle, the leeward brake should be pulled slightly to keep the wing on course.

If under strong wind conditions has to be landed apply after touch down the front

brake so that the XCitor will not roll back. Prior to landing you should wind up the brake lines around your hands so that you have enough travel to make the glider fall down behind the trike.

If the brake travel is not sufficient you may release the brake and wind it up around your hands one or two turns more. Repeat until the glider is down.

It may help if the brake is slightly released so that the XCitor rolls back with the wind in a controlled manner.

In flight turbulences

Don't fly under thermal conditions with maximum speed. This will cause high wing loads and also a small angle of attack. This will cause the canopy to fold in easier, if suddenly wind comes from above.

The best choice is a vertical position for the trim lever.

Flights in snowy conditions

They are not permitted at all. In case it starts to snow during flight the flight must be cancelled.

Extreme temperatures

There are no „normal“ temperatures (between -10 and $+50^{\circ}$ C) where limitations occur.

But you have to make sure that the cooling agent is mixed accordingly to the manufacturers instruction. At high temperatures keep watching the water temperature carefully.

In addition the required power and the required flight speed increases, so that the take off distance gets longer than in winter. This is similar to flights in high altitudes.

Special remarks

The XCitor has a unique trim system providing a fully operational backup system for steering via the brake lines.

Only for take off and landing the brake lines should be used as they provide more feedback and a quicker response.

Due to the clockwise running propeller the XCitor will bank slightly to the left and therefore fly a wide left curve.

Pushing the trim lever on the right side into a more fore position than the one on the left side will counteract that.

But even narrow curves are possible just with the trim system. Due to the propeller torque curves to the left side will be narrower than curves to the side (as long as you fly with engine power).



Caution

Don't steer with the brake to the same side as you do already with the trim system! Both inputs will be added causing steep curves with bank angles outside the limit of 60°.

They can be controlled and finished – that was proven in flight tests – but this may be difficult for inexperienced pilots.

Also high G loads will occur during such narrow curves. If you try to push just the (outer) trim lever forward this may be very difficult due to the high wing loads. In this case use the brake lines to stop the curve. Then – if still desired – the trim levers can be moved as usual.



Note

Make sure that during the start check the correct friction force of the trim levers was checked (5-8 kg!). If the move significantly easier they may be pulled back during high G manoeuvres into the fast position. When flying in a narrow curve anyway (via the

brake line) this may cause an unexpected narrowing of the curve radius, increasing speed at the same time.

This curve must be finished with the brake line as it may require much force to move the trim lever forward again.



Note

Avoid to fly curves with the trim system in addition to the brake lines into the same direction.

If one trim lever moves back due to too light movement and high G loads counteract the resulting curve with the brake line. ■

03 Emergency procedures

As already mentioned in chapter 'Certification', engines for ultralight airplanes don't have to be certified accordingly to aeronautical standards due to cost reasons. Therefore you have to be aware that such an engine may quit at any time. Please keep that always in mind!



Caution

Fly only having always a plan in mind where to land in case of a forced landing. Train flying and landing with the engine shut off. Get familiar with the glide ratio of your XCitor.

Only if you do so you will never get into a situation which will surprise and overextend you.

Engine failure

If the engine of your XCitor quits suddenly and unexpected we recommend the following procedures:

During take off roll, not airborne yet:	Keep direction, and brake the XCitor
At take off, in the air:	Straight landing
Being higher than 80 m:	If necessary make a flat curve to land the XCitor against the wind.
In flight, being higher than 100m:	Search for a suitable landing field, watch wind direction and speed. Try to land against the wind or up the hill.

Over trees or high grass etc.:	Land as if the surface of the plants would be the runway. Land as slow as possible.
Rough running engine, power loss	May indicate an iced carburettor. Watch rpm, emergency landing



Note

Fresh Breeze could never notice any case of carburettor icing even at typical icing conditions (0 - 4°C, high humidity) due to the injection system. But this is no warranty at all!

Engine start during flight

Engine start during flight can be easily done. Switch the main switch on and press the starter button. Everything else as described in chapter 'Engine operation'.

Smoke or fire on board

In case of smoke or fire on board we recommend the following procedures:

Fire at the engine on the ground:	Leave the trike as soon as possible.
Fire at the engine during take off:	Emergency landing, leave the trike as soon as possible.
Fire at the engine during flight:	Emergency landing, leave the trike as soon as possible.

Flying with the engine shut off

The speed of the best glide ratio is somewhere between 55 and 65 km/h depending on the wing load.

The glide ratio without running engine is roughly 1:4, at idle speed 1:5.

The best glide ratio is achieved if the trim levers are in a slow position (vertical or even more forward).

Forced landings

There are emergency landings in case of e.g. an engine failure and safety landings in case of e.g. an upcoming thunderstorm.

Landings without running engine are easier if the trim system is set to "slow" (vertical or more forward).

In case of a tire failure (pressure loss) try to touch down as slow as possible, using the front wheel for direction control.

Flaring as usual, in case it may be helpful to wind the brake lines around your hand to increase the travel of the brake line.

Loss of directional control

As the XCitor can be controlled either via the conventional brake lines or the newly developed trim system it is very unlikely that both systems will fail completely.

If the ability to steer is reduced try to make flat and wide curves.

If the brake lines fail flare out using the trim system, supported with some gas.

X-Wing Evo

This chapter is about the X-Wing Evo, the wing of the XCitor trike. Pilots should have at least a basic knowledge about paragliding from their flight school courses. Therefore the manual only focus on the specialties of the canopy and its suspension system.

The X-Wing Evo was designed as a part of the XCitor system together with the newly designed trim system, all components were carefully adjusted for maximum performance and safety. Therefore the glider can only be flown on the XCitor and the XCitor is not allowed to be used with any other wing as long as Fresh Breeze does not provide any other information.

If there are any questions left which are not covered by this manual please contact your local dealer.

04 Safety

Safety notices

Safety notices are issued when defects arise during use of a paraglider which could possibly also affect other gliders of the same model. The notices contain instructions on how the affected gliders can be inspected for possible faults and the steps required to rectify them.

Fresh Breeze publishes on its website any technical safety notices and airworthiness instructions which are issued in respect of Fresh Breeze products. We will also send you safety notices directly by email if you have registered your product.



WARNING

The paraglider owner is responsible for carrying out the action required by the safety notice.

Safety notices are issued by the certification agencies and also published on the relevant websites. You should therefore visit on a regular basis the safety pages of the certification agencies and keep up-to-date with new safety notices which cover any products relating to paragliding (refer to Appendix for addresses).



Services such as RSS are also available which allow internet users to follow various websites and changes to them without having to access them individually. This allows much more information to be followed than was previously the case.

Disclaimer, exclusion of liability and operating limits

Use of the paraglider is at the pilot's own risk!

The manufacturer cannot be held liable for any personal injury or material damage which arises in connection with Fresh Breeze GmbH or which occurs in connection with the XCitor and its components like the X-Wing Evo. The certification and warranty shall be rendered invalid if there are changes of any kind (incl. paraglider design or changes to the brake lines beyond the permissible tolerance levels) or incorrect repairs to the glider, or if any inspections are missed (annual and 2-yearly check).

Pilots are responsible for their own safety and must ensure that the airworthiness of the glider is checked prior to every flight. The pilot should launch only if the paraglider is airworthy. In addition, when flying outside of Germany, pilots must observe the relevant regulations in each country.

The glider may only be used if the pilot has a licence which is valid for the area or is flying under the supervision of an approved flying instructor. There shall be no liability on the part of third parties, in particular the manufacturer and the dealer.

In terms of the warranty and guarantee conditions, the paraglider may not be flown if any of the following situations exists:

- the inspection period has expired, or the inspection has been carried out by the pilot him/herself or by an unauthorised inspector
- the take-off weight is not within the permissible weight range
- the glider is flown in rain or drizzle, cloud, fog and / or snow
- the canopy is wet
- there are turbulent weather conditions or wind speeds on launch higher than 20km/h
- air temperature below -10°C and above 50°C
- the glider is used for aerobatics/extreme flying or flight manoeuvres at an angle greater than 60°
- the pilot has insufficient experience or training
- the pilot has incorrect or inadequate equipment (reserve, protection, helmet etc.)
- the glider is used for winch-launching
- there have been modifications to the canopy, lines or risers which have not been approved
- the glider is opened in free fall - this is not a parachute

For your safety

Prudence and risk-awareness are basic requirements for the safe practice of paragliders, for the very reason that it is so easy to learn and practically anyone can do so. Carelessness and overestimating one's own abilities can quickly lead to critical situations. A reliable assessment of conditions for flying is particularly important. Paragliders are not designed to be flown in turbulent weather. Most serious accidents with paragliders are caused by pilots misjudging the weather for flying.

In Germany, paragliders are subject to the guidelines for air sports equipment and must not under any circumstances be flown without a valid certification. Any attempt to fly without proper training is highly dangerous. Independent experimentation is strictly prohibited. This Manual does not replace the need to attend training at a paragliding school.

A specialist must test-fly and inspect the paraglider before your first flight. The test-flight must be recorded on the paraglider information label.

When you fly for the first time, fly under the supervision of a flight instructor and in a well known area. For this flight and for all other flights, you must wear an approved helmet, gloves, firm shoes and suitable clothing. Only fly if the wind direction, wind speed and current and forecasted weather conditions guarantee a safe flight.

The Manual must be passed on to any new owner if the XCitor or X-Wing Evo is sold. It is part of the certification and belongs with the model.

Observe the other specific safety advice in the various sections of this Manual.

Flying with a wet canopy or when it is raining or snowing is prohibited; it may cause the glider to stall.

Do not under any circumstances alter the construction of your paraglider. If you do so, any claims under the warranty will not be accepted and the certification will lapse.



WARNING

The safety advices and instructions contained in this Manual must be followed in all circumstances. Failure to do so shall render invalid the certification and/or result in loss of insurance cover, and could lead to serious injuries or even death.

Types of use

The paraglider may only be used for the purpose for which it is designed. Any use other than as intended is not permitted. Do not under any circumstances use the paraglider as a parachute.

Winch launch

The X-Wing Evo does not have certification for winch launch. Do not under any circumstances tow the X-Wing Evo with a car, motorboat, a winch or any similar device.

Aerobatics

Aerobatics are prohibited in Germany. The XCitor is not designed for any aerobatics including banking angles of more than 60°.



WARNING

Any type of acrobatic manoeuvre at all on the XCitor is contrary to law and illegal. The pilot would be putting his/her life at risk. Acrobatics involves a risk of unpredictable flight attitudes, which could lead to damage to material and structural failure.

05 X-Wing Evo features

Description

The X-Wing Evo is a paraglider which was especially designed to fit the XCitor trike. Together with the newly designed suspension system it was tested and certified within the limits as described in the technical data section by the Air Turquoise SA (official test laboratory of Switzerland) and DGAC.

The X-Wing Evo is either controlled as usual using brake lines or by a newly developed trim system, which can be used as well to compensate the propeller-induced torque.

Shifting the connection point between trike and paraglider fore and aft the complete system can be adjusted in a wide range according to different load and equipment states.

Suspension system

⇒ ⚠ Possible canopy collapses in turbulent air will become more dynamic as the wing load is increased. Decreasing the canopy's angle of attack by opening the trimmers (fast flight) will intensify this effect.

Due to this reason the X-Wing Evo is not allowed to be steered simultaneously by the brake lines and the trim system into the same direction if the trim levers are set to a fast flight position (which more aft than vertical).

This would be possible if e.g. the trim levers are set to a narrow curve, and then additional brake input is applied to make the curve even narrower.

If the brake lines are just for steering the trim levers should only be used to compensate the engine torque and for

general speed settings, not for an additional steering.

In general the inputs of the trim system and of the brake lines will be added to each other.



Note

It is crucial to ensure that changes to the brakes do not cause them to be activated when you don't want them to be. The paraglider should first be pulled up and brought under control whenever the brake line was modified.

The trim system is helpful to set the trim speed (cruise speed) and do counteract the engine torque. During take off and landing the trim levers should be in a slow (=vertical) position.

The paraglider is connected with the suspension bows using four 6mm-carabiners. The suspension bows have four holes close to their upper edge where these carabiners go through. The first (most forward) carabiner takes the A-lines, the last one (most aft) the D-lines etc. The left bow is connected with the left side of the canopy, the right bow with its right side.

Both bows are connected with a rotatable joint which keeps them also in the correct distance to each other. For easier transportation this joint can be taken apart, it is just stuck together.

The lower end of the suspension bows is connected with a 3-ton-belt (30 mm polyester belt) to a bigger carabiner which is the main joint between wing and trike. This carabiner is used to separate the wing from the XCitor if necessary. Check that it is correctly closed prior to each flight (as all the other carabiners).

The XCitor has another polyester belt loop around its top tube (roll over tube) which goes into this carabiner as well. This loop

cannot move forward or aft as it is tied to an aluminium clamp around the main tube with a 5mm-Polyester rope.

Moving this clamp fore or aft changes the flying angle of the XCitor and is used to adjust it to different weight and equipment states.

The connection rod between both suspension bows lays on top of the XCitor prior to start, one can say, on it's roof. ■

Technical data

Description	Units	28	24
Flat Area	m ²	33,80	29,92
Flat Wingspan	m	13,0	12,6
Flat Chord	m	3,1	2,8
Flat AR		5,0	5,3
Projected Area	m ²	27,95	24,74
Projected Span	m	10,1	9,8
Projected Height	m	3,1	2,9
Projected AR		3,7	3,9
Nr Cells		53	53
Bridle Count		230	230
Bridle Length	m	548	513
Bridle Height	m	6,9	6,7
Min. take-off weight	kg	200	200
Max. take-off weight	kg	383	344

06 Setting up the X-Wing Evo and test-flying

Before the first flight



WARNING

A specialist must test-fly and inspect the paraglider before your first flight. The test-flight must be recorded on the paraglider information label.

During production, the X-Wing Evo goes through several quality control checks before finally undergoing an exact type certification test. Conformity with the reference specimen is checked and certified before the glider is delivered to the customer. Extreme care is taken in the manufacture of all patterns, lines and riser lengths. They show a high level of precision and should not be altered under any circumstances.



WARNING

Any changes or improper repairs to this paraglider shall render invalid the certification and warranty.

Adjusting the main brake lines

The X-Wing Evo is delivered ex factory with a brake adjustment marked which complies with the test sample and which should not be altered. This adjustment will allow you to steer and land the paraglider almost without delay.

The main brake lines must be checked by an expert before the test flight.

Factory setting

Correctly adjusted brake lines have nearly no idle displacement. This means that the brake lines must not be pulled very much down before the trailing edge of the canopy starts to move downwards and the glider starts to react. The manufacturer has pre-set the brakes in this way, which means you are able to steer and land the glider with nearly no delay. Note that the brake cascades already cause drag by their aerodynamic resistance.

Modern gliders such as the X-Wing Evo have less tolerance with regard to adjustment of the brake lines. It is therefore normally not necessary to alter the length.

If you do nevertheless adjust the brakes, under no circumstances should you go above or below the tolerance levels.

Incorrect adjustment

If the brake lines are too long, the paraglider reacts slowly and is difficult to land. The brake lines can be adjusted during flight by wrapping them around your hands which will improve the flight characteristics. Adjust the brake lines to the correct length after you have landed. Changes to the braking distance should always be made in small increments of no more than 2 to 3cm and must be tested before the next take off. The left and right brakes must be adjusted symmetrically.

If the brakes are shortened, care must be taken that the paraglider is not slowed down in trim and accelerated flight because of the brake lines being too short. Safety issues may arise and performance and launch behaviour may deteriorate if the brake lines are shortened too much. →

**WARNING**

If the brake lines are too short, the following risks could arise:

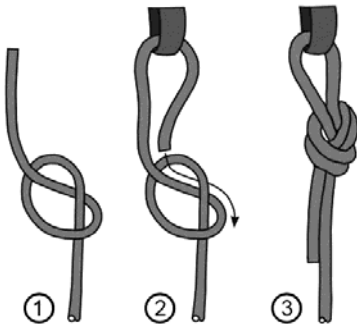
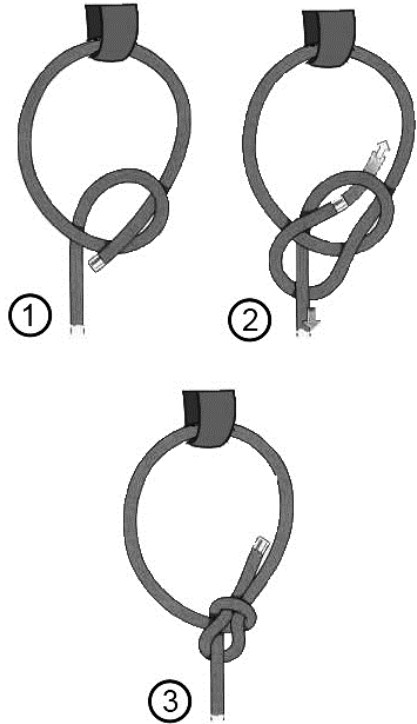
- there could be an early or unexpected stall
- the paraglider does not launch well and there is a risk of deep stall
- the paraglider exhibits dangerous behaviour in extreme flying
- the trailing edge of the paraglider is braked in accelerated flight which, in an extreme case, could cause a frontal collapse

Recommendation

We recommend the 'wrap' technique prior to a landing as well. Doing so the potential brake travel can be increased. This makes it easier especially under windy conditions to make the glider come down straight behind the trike. Don't fly too slow and don't wrap the brake more than 1x around the hand as long as you are in the air so that no stall might occur during the flight.

Brake knots

The overhand knot and bowline knot shown below are the most suitable for connecting the brake line to the brake handle.

**Fig. 3:** Overhand knot**Fig. 4:** Bowline knot**WARNING**

Loose, unsuitable or incorrectly tied brake line knots can cause the main brake line to loosen and then lead to loss of control of the glider.

Ensure that only overhand or bowline knots are used and that they are tied correctly.

First flight

Carry out your first flights only during stable weather, and in a familiar area.

You should steer gently and carefully to begin with so that you can become accustomed to the reactions of the glider without stress.



WARNING

Do not overestimate your own abilities.
Do not allow the paraglider category or the behaviour of other pilots to make you careless.

07 Flying the X-Wing Evo

Pre-flight check and laying out the paraglider

Before launching, always check the following:

- Any tears in the glider or other damage?
- Any knots or tangles in the lines?
- Brake lines clear and attached firmly to the handle?
- Brake lines adjusted to the correct length?
- Is the handle connected to the magnetic holder strapped around the “roll over tube” close to the trim levers?
- All carabiners fastened securely to the lines and to the suspension bows?
- Is the canopy dry?
- Risers and seams in good condition?
- Is the handle of the ballistic recovery system un-secured?
- All lines hold with the cable binder at the side of the prop protection cage?



Note

A careful pre-flight check is required for any type of aircraft. Make sure that you exercise the same level of care each time carry out the check.

Place the paraglider with its upper surface against the ground and spread it out so that the leading edge is slightly curved and the trailing edge is showing towards the XCitor.

Carefully sort out all the rigging lines and make sure that there are no lines underneath the canopy, tangled or caught up in any way.



WARNING

If there are obvious folds in the glider because it has been tightly packed or stored away for a long time, then the pilot should carry out some practice inflations before first launch and smooth out the trailing edge a little. This ensures that the flow profile is correct during launch. It is particularly important in low temperatures that the trailing edge is smoothed out.

6-point check

The 6-point check is carried out immediately before launch to check once again the most important safety points. It should always be carried out in the same sequence so that nothing is overlooked. The 6 points are:

1. Is personal equipment correct: safety belts (the rear seat has 3 safety belts!), carabiners, recovery system, helmet?
2. Is the canopy arranged in a half-moon shape and are all the air-entrances open?
3. All lines untangled and are any lines under the canopy?
4. Both trim levers vertical, and are the brake handles at hand?
5. Does the weather, in particular wind direction and strength, allow a safe flight?
6. Airspace and launch area clear?

Use of the trim system



WARNING

Disturbances (e.g. collapses) are much more dramatic with increased speed than when the glider is set to a slower cruise speed. Because of the increased risk of collapsing, we strongly recommend that you do not set the trim system to high speeds when flying under turbulent conditions or close to the ground.

The trim system consists of 2 trim levers, which can be moved fore and aft against a certain friction force (5-7 kg at the handles). The friction force can be adjusted with the centre screw of the trim levers.



Note

Never use grease or oil etc. at the bearing of the trim lever!

The trim levers are connected via a rope with the end of the suspension bows. This systems causes the wing to twist, but it works like a brake line: Pushing the lever forward to a slow position causes the trailing edge of the glider to go down, increasing the angle of attack and making this side slower. If one lever is more forward than the other the glider will steer to this side. If both levers are pulled back the glider will accelerate and fly with a higher speed. Vice versa the XCitor will fly slower if both levers are pushed forward.



Note

The connection rope from the trim levers to the suspension arcs goes 3 times around a roll. This roll can move freely only into one

direction, the other is locked. Pushing the lever forward will cause the roll to rotate. If the lever is released the glider tries to pull the lever back. But as the roll cannot turn it the rope is pulling itself tight around the roll. The more the glider pulls the tighter the rope will be!

Only if the lever is pulled back by hand then the rope is "pushed" towards the roll, causing an immediate release. So the rope can slide around the locked roll. In order to make it impossible for the glider to pull the trim lever back when it is released there must always be the required friction force at the trim lever!

Make yourself familiar with this system under calm conditions. Move both trim levers from their vertical start position roughly 5 cm back to you. The trailing edge will come up and the XCitor will fly faster.

Try to fly wide, then steeper curves just with the trim levers. Don't forget to push the trim levers back to their vertical position prior to landing! Then you will be not too fast, but fast enough to flare out during touch down.



Note

Extreme wing loads and an insufficient brake performance of the trim levers could cause the brake levers being pulled back by the wing from the slow to the fast position. If this happens not symmetrically the XCitor starts to fly a curve. This curve can be easily compensated during its beginning with the brake lines. But if the pilot waits until the curve gets steeper and becomes a spiral it takes much force to steer against it. Also much force is required to push the trim lever forward into its slow position again.

In this case it would be easier if the other trim handle is pulled back from slow to fast like the other. Then the XCitor stops →

its spiral flight. This can be supported by the brake lines. After the G forces are normal again the trim levers can be pushed back easily into a slow position.

This is just an emergency procedure in case several mistakes were done:

- The movement of the trim levers is too easy, this was not correctly checked prior to take off
- The wing load is far beyond the permitted limits (2 G or 60° roll angle)
- Too late or no reaction in case the trim lever is being pulled back by the glider.

Take off, cruise and landing

If the wing pulls too much to the side during take off, the pilot has to brake the opposite side of the wing and he must steer the trike into the same direction the wing is pulling.

If this isn't sufficient the take off must be cancelled. This is much better than to try to take off anyway, maybe in a steep curve, and to land very hard immediately afterwards, or to roll over with the complete XCitor. Though this happens not easily as the centre of gravity is as low as possible and the wheel base wide.

If the glider collapses already during take off (if that happens, then most likely in the outer area of the wing) then you may continue with the start. But don't take off, use the brake lines instead to open the canopy fully again. Then give full gas and take off only with a fully opened and cantered canopy.

Pilots with good skills are able to drive full circles with the glider in the air with less than 50 m in diameter.

Flying under turbulent conditions



Caution

Take care crossing your own vortexes!

Though the tendency to collapse is significantly reduced due to the high wing load of the XCitor, in turbulent air you should fly it with the trim system set to slow.

The stabilizing effect of the increased pressure inside the wing at higher speeds is more than counteracted by the smaller angle of attack.

Use both brake lines in turbulent air and keep them slightly pulled down (20%), and keep the canopy above you and centred with active work at the brake lines. This reduces the risk of a collapse.

If the canopy collapses anyway on one side, keep the direction with the brake lines (and, if necessary, fly away from any obstacles). Only if you fly stable "pump" the brake on the collapsed side to re-open the wing quicker. You may have to do it forcefully due to the high wing load.

If you fly into very thermal conditions fly slowly but don't pull the brake too much to stay away from a dynamic stall. If you leave such a thermal area pull the brake lines to avoid a forward shooting canopy and the potential risk of a front collapse. You may give more gas as well to increase the angle of attack.



Note

If the canopy collapses on one side brake the other side until the XCitor is flying straight forward. But better use less than too much brake input!

Landing with engine shut off

In principle landing with the engine shut off is the same as if it is still running – always facing the wind. But the speed should be kept up high enough for a proper flaring. So hold the brake lines up until you are roughly 2 m high. You should wind them 1x around your hand to have more brake travel. In 2m altitude start to apply brake continuously. Just at touch down the brake lines should be completely pulled down.

If due to wind the canopy doesn't fall down behind the trike you may release the brake for a moment, wind them 1x more around the hand and pull it again. You may repeat this procedure until the glider comes down.

If the canopy pulls too much to the side the trike may finally roll over. Therefore keep the canopy centered as good as possible behind the trike.

If the wind is quite strong it may help to get the canopy down by not braking too much with the front wheel. Then the trike may roll back with the wind a little bit.

Landing with help of engine

As the wing load of the XCitor is quite high compared with a backpack motor, the X-Wing Evo should not be flown too slow prior to touch down. We recommend to keep the brake wide open until you reach roughly 2 m, and then pull it continuously down until you touch the ground. At this time the brake should be fully applied.

Please make sure that the brake line is perfectly adjusted to your XCitor so you don't lose brake travel when landing.

You may use the engine to adjust the descent rate. Control altitude and speed with brake lines and gas.



Caution

Being close to the ground watch your air speed carefully, don't fly too slow: Always much faster than your stall speed!

Normal flight

The best glide ratio is achieved in calm wind conditions without using the brakes, and the trim system set to slow (vertical levers).

The smallest rate of descent is achieved if 20 to 30% brake is applied, at the slowest setting of the trim system (levers completely forward). If more brake is applied the sink rate will increase again. This is helpful during the final approach.

With flat turns in thermal conditions, both brakes should be applied and the radius of the circle corrected using the outer brake.

As we said, the technique described above is suitable for flat turns. However, to enter a thermal area or to achieve greater banking angles, brake on one side only. Even though the X-Wing Evo has no negative tendency, this should always be done carefully.

The steering of the X-Wing Evo is still possible using the trim system if you are unable to steer using the brake lines.

In the test flights, we were not able to force a stable deep stall.

Rapid descents

In some flying situations a very rapid descent is necessary to avoid a dangerous situation, e.g. the upcurrent from a cumulus cloud, an approaching cold front or a storm front.

The design of the X-Wing Evo and the high load means that the B-stall and "big ears" manoeuvres are not possible. The →

spiral dive can be used as a rapid descent method. It should first be practised in calm conditions and at adequate altitude so that it can then be used effectively in extreme conditions.



Note

With all rapid descent methods, the trim system should be completely set to slow and the rpm's reduced to idle.

All of the manoeuvres are more dynamic than when you fly with a backpack system or even without a motor due too the high wing load.

Spiral dive

The spiral dive is the classic method for making a rapid descent with a sink rate of up to 14 m/s in normal flight situations, and up to 20 m/s in extreme flight situations. It is particularly suitable where there is a high ascent rate and little wind. Spiral dives with a sink rate above 14 m/s are not tested on certification; this exceeds the manufacturer's limits.

Initiation

Whilst flying at full speed, start to apply the brake on one side. This will steer the paraglider into a turn with a strong bank. You can tell that you are in a spiral dive if you are being pressed hard against your seat (high centrifugal force).

When you are in a spiral dive, you should steer very carefully because the paraglider will react immediately. Banking and rate of turn increase if braking efficiency increases. Look down before and during a spiral dive so that you always know how far you are away from the ground!

Recovery

Recover from the spiral dive slowly and carefully. If you release the brakes too quickly, the increased speed can cause the wing to climb, become unsettled, or partly collapse.

Due to the reduced possibility when flying in a trike to use weight-shifting, you must always recover actively from the spiral dive with the outside brake.



WARNING

In the spiral dive, very high turn speeds can be reached with an increase in acceleration due to gravity (up to over 6g), so exercise care when attempting this manoeuvre. Take note of the following:

- Do not continue the spiral dive for too long: it could cause a loss of consciousness.
- Always maintain ground clearance of 150 – 200m.
- If you lose control over the flight manoeuvre and sink rate, the glider will go into a stable spiral. If this happens, immediately deploy your reserve!
- Stress loading and/or loss of consciousness can occur during the spiral which make subsequent recovery impossible.
- Spiral dives combined with other methods like B-stall or "big ears" are not possible with the XCitor without any changes and are not allowed at all.

08 Dangerous situations and extreme flying

Dangerous situations

Extreme flying with a motor trike and full gas are extremely dangerous and therefore cannot be tested. They must be avoided at all costs.

Problems do not arise during a normal flight. However, pilot error, extreme wind conditions or turbulence which goes unnoticed by the pilot for too long may leave the wing in an unusual flying position, requiring special reaction and skills on the part of the pilot.

In this section we explain how to correct extreme situations if they do arise. The manoeuvres described below are based on the legal -take-off weight as described in the technical data section.



WARNING

Always keep within the recommended limits. Avoid aerobatics and extreme loading such as spirals and big ears. This will prevent accidents and avoid over-loading the glider.

In turbulent conditions, always keep enough distance from rock faces and other obstacles. Time and sufficient altitude are needed to recover from extreme situations.

Deploy your reserve if the corrective manoeuvres described in the following sections do not return the glider to a controllable flying position or if there is not enough altitude for correction.

Safety training

These instructions do not replace safety training or specialised literature. We recommend that you undertake special safety training which will prepare you for extreme situations.

If you plan to attend a safety training course, it is essential that you take part beforehand in the special XCitor instruction course. This will teach you about the XCitors's special features, flight behaviour and structural stress.

Material stress and damage

Fresh Breeze advises against subjecting the materials of the X-Wing Evo to excessive stress during a safety training course.

Uncontrolled flight positions can occur during safety training, which are outside the manufacturer's limits for the paraglider and which can put the glider under excessive stress.

Trimming the line lengths and canopy material after safety training can lead to a general deterioration in flight characteristics.

Damage as a result of safety training is not covered by the warranty.

Collapsing the paraglider

Asymmetric collapse

Asymmetric collapses are caused by the stagnation point moving to the trailing edge of the glider. A negative angle of attack makes part of the canopy collapse and tuck under, and the glider may plunge down, turn away or spin.

During test flights the X-Wing Evo self-recovered on release of the A-risers which were pulled down to initiate the collapse. It turned less than 90° and stabilised itself. →

Recovery

Should an asymmetric collapse occur, counter-brake slightly on the side of the glider that is still inflated to stop it turning away and to stabilise it, until the glider flies straight ahead again. With large asymmetric collapses, it is important to counter-steer carefully so that the glider does not stall completely and go into a full stall. After an asymmetric collapse, first control the direction and fly away from the slope.

If you are not able to stop the glider turning, without causing the inflated side to stall, allow the glider to turn slightly while you open the collapse.

Counter-steering and weight-shifting are generally enough to re-inflate the collapsed part of the glider.

If the collapsed part does not open automatically or does not open completely, reinflation can be assisted by applying light brake pressure on the collapsed side (but not hectic “pumping”) while counter-steering on the opposite side. Make use of the full braking distance, but be careful not to stall the glider on one side.



WARNING

Counter-steering too strongly on the inflated side of the glider can result in a stall and to further uncontrolled flight manoeuvres (cascade of events).

Asymmetric collapse with tangling

Following a very large collapse, the wing-tip of the collapsed side may become trapped in the glider lines. Here too counter-braking and weight-shifting must be used to stop the glider from turning away. The trapped end can generally be opened by a short, fast pull on the brake lines.

If the tangle has not come free after several attempts, you still have the option to open it like a deep stall. These flight manoeuvres always require adequate altitude and a high level of pilot skill.



WARNING

Deploy your reserve if the corrective manoeuvres described in the following sections do not return the glider to a controllable flying position or if there is not enough altitude for correction.

Front stall

A negative angle of attack, caused by strong turbulences, can also cause part or all of the leading edge of the glider to collapse.

Recovery

The X-Wing Evo will normally recover automatically from a front stall, but re-inflation can be assisted by rapid, light symmetrical brake input on both sides.

If the X-Wing Evo does not immediately recover from a frontal tuck, brake quickly and strongly with both steering-lines (brake lines) to re-inflate the glider.



Note

Any weather condition which causes a front stall is much outside the allowed and safe weather conditions. If you get into such weather land as soon as possible and continue not before the weather got quieter!

Types of stall

When a paraglider flies through the air, a laminar and turbulent boundary layer is created. Extremely dangerous flight configurations can result if the laminar boundary layer is interrupted, with practically the entire airflow along the top surface braking away. This happens in particular when the angle of attack is too great.

There are three different types of stall in paragliding.



WARNING

Full stall and spin are manoeuvres which can be fatal if recovery is not correct. These manoeuvres should therefore be avoided. However, it is important to learn how to recognise the indications that a glider is about to stall so that you can take immediate action to prevent it.

Deep stall

Paragliders can go into a deep stall for a variety of reasons: brake lines too short (no slack), old or damaged glider material which therefore has increased level of permeability, altered trim/line length and changes to profile characteristics caused by moisture (e.g. flying in rain). Paragliders have a particular tendency to stall if the wing-loading is too low.

In a deep stall, the airflow from the front reduces and the glider goes into a stable flight attitude without forward momentum. The paraglider sinks almost vertically at 4-5m/s and there is noticeably less flight noise.

Recovery

The X-Wing Evo couldn't be deep-stalled at all during our test flights. The usual recovery procedure would be to decrease the angle of attack by shortening the A- and B-lines. But this would require huge forces at the XCitor. Better would be to decrease the angle of attack by pulling both trim levers back.



WARNING

A wet canopy or flying in the rain increases the weight of the canopy and may cause a stall. You are not allowed to fly under these circumstances.

Full stall

The full stall happens when the wing partially deflates and loses its arched shape. It is triggered when the maximum possible angle of attack is exceeded. The most common cause is going below the minimum speed or flying near the minimum speed combined with the effects of turbulence.

In full stall, the paraglider loses its forwards travel, surges backwards and deflates. If the brakes are held down, the canopy comes up over the pilot again. The result is an almost vertical descent with a sink rate of approx. 8 to 12m/s.

Recovery

Slowly release the brakes, making sure that this is done symmetrically. As soon as the glider is completely open above the pilot, fully release the brakes within 3 seconds. If you release the brakes in this phase too slowly, the paraglider may spin. The spin stops automatically when the brakes are released completely. →

As this is done, the canopy accelerates forwards dynamically and picks up speed. Do not brake too soon (otherwise it could go into a full stall again), and be careful to avoid a front stall by making sure that it does not shoot too far forwards.



WARNING

If the canopy has gone back during the full stall, the brakes must be held down, otherwise the canopy may surge forward and, in an extreme case, end up underneath the pilot. Hold the brakes down until the canopy is above you again.

Spin

The spin is a stable flight attitude, in which one side of the canopy stalls, while the other side continues to fly forward. The glider turns around the stalled side of the wing.

Recovery

To recover from the spin, the pilot must quickly release the brakes. The stalled side of the wing will then speed up again. Depending on recovery and the dynamic of the circular motion, one side of the canopy may shoot forwards and suffer an asymmetric collapse. If the pilot suspects that the glider has unintentionally been put into a spin, the brake which has been pulled down too far must be released immediately.



WARNING

If the spin does not stop, check whether you have released the brakes fully!
Is the spin still doesn't stop, use your recovery system.

Other tips for dangerous situations

Deep stall in rain

In general, there are two reasons why a paraglider may go into deep stall in rain:

1. The first risk lies in the fact that the canopy weight increases if a glider is flown in rain for any length of time. The centre of gravity and angle of attack then shift, which can result in airflow separation/stall. It is relevant here that if a glider absorbs more water (as older gliders do because they lose their water-repellent coating over time) and is closer to the deep stall limit because of its design and age, less water absorption and thus weight increase will put the glider into deep stall.

2. When it is raining, there can be so many water droplets on the top surface of a glider that almost the entire upper surface is affected but, even so, the drops "bead" so the surface is not wet through. This makes the top surface so "rough" in texture from the drop formation that the airflow over the top of the wing separates from the surface. This phenomenon has been known for some time from hang-gliding and gliding. With new gliders, the droplets are absorbed less quickly by the fabric. Thus, the newer a glider is, the greater the number of droplets caught on the top surface and the bigger those droplets are, the greater the risk that there could be airflow separation. We were able to recreate these conditions by practical tests and computer simulations, but they occur very rarely.

It is the case in both of the above situations that the control travel and braking distance first reduce and then the deep stall is caused, mostly by alteration of the brake travel or angle of attack, e.g. by a gust or thermal. →

**WARNING**

Flying in extremely humid weather or in rain is outside of the operating limits of the glider. If you are not able to avoid flying in rain, please observe the following:

- it is advisable to fly with slight acceleration during and after the rain (min. 30% or more)
- use no brake input or as little as possible
- control travel reduces
- avoid tight turns, especially in the final approach. If conditions allow, you should also fly slightly accelerated in this phase
- avoid large angles of attack and the possible early stall near the ground (release the speed bar only slowly)

process of the structure and should therefore be avoided.

The glider must be inspected earlier than is usually the case if it has been put under more than the usual degree of strain.

Sand and salt air

In many cases, sand and salt air cause the lines and fabric to age much more rapidly. If you often fly near the sea, the glider should be inspected more frequently than normally required.

Temperature range

Temperatures under $-10\text{ }^{\circ}\text{C}$ and over $+50\text{ }^{\circ}\text{C}$ can make the paraglider unfit to fly. The manufacturer's warranty will lapse if the glider is used outside of this temperature range. ■

Advertising and adhesives

Always make sure before attaching advertising to the glider that the adhesive planned will not alter the glider's flight behaviour. If you are in doubt, we recommend that you do not attach the adhesive.

**Caution**

Attaching adhesives to the glider which are large, heavy, or made of unsuitable material may result in revocation of the certification.

Overloading

The glider structure is put under high levels of strain in particular on extreme flight manoeuvres, rapid descent methods (spiral dives) or prohibited aerobatic manoeuvres. They considerably accelerate the aging

09 Storing and looking after the paraglider

Storing the paraglider

Packing the paraglider

It is very important to pack the glider carefully in order to ensure the longevity of the leading edge reinforcements. Fold up the X-Wing Evo as shown in the diagrams below. The leading edge reinforcements (Mylar and Rigid-System) on the front edge are placed on top of each other to avoid bending or misshaping them. This method of packing ensures that the leading edge is treated carefully, which will increase the glider's life, performance and launch behaviour.

If the reinforcements have been bent or misshapen, they distort more easily during flight, creating an altered air inflow which can lead to a loss in performance and changes in flight behaviour.

The leading edge reinforcements also perform an important function on launch. Therefore, the less they have been bent, the more easily the glider will inflate and launch.

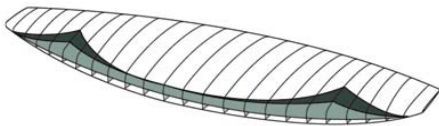


Fig 5a: Spread out the paraglider completely on a smooth surface



Caution

Do not drag the paraglider across any rough surfaces such as gravel or asphalt. This may damage the seams and surface coating.



Fig 5b: Next, all the ribs on one side are placed “accordion-wise” side by side, so that the leading edges are not bent.

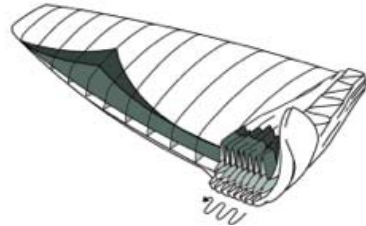


Fig 5c: Now place the internal protection bag provided underneath the section of glider which has been folded together so that the ribs are all lying along the length of the protection bag. Then continue as in the second step, placing the leading edges “accordion-wise” side by side until you reach the tip of the glider.

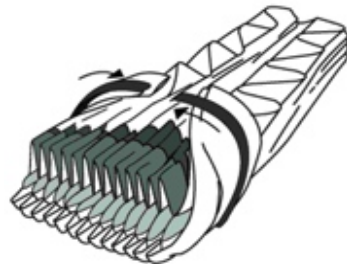


Fig 5d: The glider is now folded up along its length, and the leading edges are side by side without having being bent.

Fasten the Velcro straps near the leading edges, so that they do not slip. →

**Note**

Make sure that the leading edge reinforcements lie flat and are not bent or twisted by doing up the Velcro too tightly.

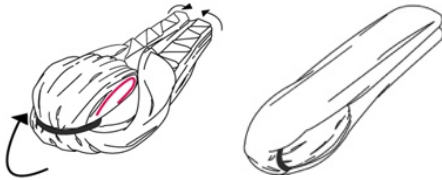


Fig 5e: Fold up the glider along its length, with the first fold below the leading edge reinforcements. Pay particular care not to bend any of the rigid reinforcements! Next, do up the zip, making sure that none of the lines or fabric is caught in the zip.

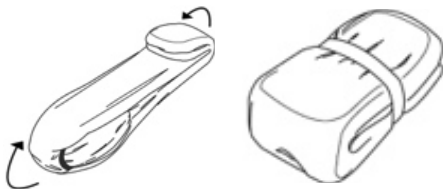


Fig 5f: Fold the glider again. Then place the compression strap around the glider and fasten it by pulling gently. Make sure that the glider is only loosely folded and is not bent or compressed excessively.

Storing and transporting the glider

Even if your paraglider was completely dry when it was packed up after the final flight of the season, for long-term storage you should if possible take it out of the backpack and spread out the canopy a little in a clean, dry place away from direct light. If you do not have the space to do this, then open the backpack, internal bag and belt as much as possible and avoid compressing it. It must be stored at a temperature between

10° and 25° C and in relative humidity between 50 and 75%. Make sure too that the paraglider is not stored in a place where animals such as mice or cats could use it as a place to sleep.

Do not store the paraglider near any chemicals. Petrol, for example, causes the material to disintegrate and can cause considerable damage to your paraglider. When your equipment is in the car boot, keep it as far away as possible from any spare petrol cans or oil containers.

The X-Wing Evo should not be exposed to extreme heat (e.g. in the boot of the car during summer). The heat may cause any moisture present to be pressed through the fabric, thereby damaging the coating. High temperatures accelerate the process of hydrolysis, particularly when combined with moisture, which damages fibres and coating. Do not store your paraglider near radiators or other heat sources.

Always transport your glider in the special inner bag and use the backpack provided for the rest of the equipment.

Looking after the paraglider**Fabric**

Fresh Breeze uses a specially developed polyamide fabric for the X-Wing Evo which has a high-quality coating for improved UV resistance, colour fastness and air permeability. This fabric undergoes rigorous laboratory tests and was tested for several months under extreme conditions and heavy use in flight.

Care is essential to ensure that the fabric and glider remain durable and retain their qualities. The glider should therefore be protected from unnecessary UV light. Do not unpack your glider until immediately before flight and pack it up straight after landing.

Modern paraglider fabrics have →

better protection against the sun, but UV rays in particular are still one of the decisive factors in how the fabric ages. The colours will fade first and then the coating and fibres will begin to age.

When the X-Wing Evo is manufactured, the side of the fabric with the coating is kept to the inside. This provides relatively good protection from damage for the coating which is of key importance to the fabric's features. When choosing a place to launch, try to find somewhere which is smooth and free of stones and sharp objects.

Do not stand on the glider. This weakens the fabric, especially if it is on a hard or stony surface. Pay attention to the behaviour of spectators at the launch site, especially children: do not hesitate to draw their attention to the sensitive nature of the fabric.

When you are packing up your glider, make sure that there are no insects trapped inside. Many insects produce acids when they decompose, which can cause holes in the fabric. Grasshoppers make holes by biting through the fabric and also excrete a dark liquid which stains. Keep animals away when you are packing up. Insects are not attracted by any particular colours, contrary to what is commonly believed.

If the glider gets wet or damp, it should be dried as soon as possible in a well-ventilated room (but out of the sun). It may take several days before the canopy has dried completely because the fibres absorb water. Mould may form if the paraglider is stored wet and the fibres may rot, particularly when it is warm. This can make the paraglider unsuitable for flying within a short time.

A brand-new glider will often be compressed when delivered. This is solely for the initial delivery and the glider should not be compressed in such a way again. Do not pack your glider too tightly after use and,

even though it is very comfortable, never sit on the backpack with the glider inside.

If salt water gets on the glider, it should be rinsed immediately in fresh water (refer to the section "Cleaning").

Lines

The X-Wing Evo has various different high-quality and accurately manufactured lines which have been selected according to the load and area of use. You should also protect the lines from unnecessary UV light because, as with the fabric, UV light in particular will weaken the lines.

Dyneema lines, which are used in the area of the main brake lines, for example, are very temperature-sensitive and can be permanently damaged at temperatures above 75° C. Therefore your glider should never be stored in a hot car especially during summer.

Be careful that there is no abrasion caused to the coating on the lines by rubbing.

Do not walk on the lines after the glider has been spread out and watch out for spectators who may inadvertently go over the lines.

When you are packing up the glider, be careful to avoid putting any unnecessary kinks in the lines and use only the overhand knot or bowline knots described for the brake lines.

Rigid construction

Nylon rods are used in the X-Wing Evo (rigid construction), which create the leading edge's shape and the canopy's stability.

To ensure that the Nylon rods keep their shape, it is important that you pack the glider as described in the section "Packing the paraglider". →

The Nylon rods on the X-Wing Evo can all be replaced through small pockets. If you notice that a plastic rod has been damaged or misshapen because of incorrect use, this can be replaced by Fresh Breeze or a Fresh Breeze authorised workshop.

Cleaning

If you do have to clean the glider, use only lukewarm fresh water and a soft sponge. Use a weak soap solution for stubborn stains, and then rinse it out carefully and thoroughly. Leave the glider to dry in a place which is well-ventilated and in the shade.



Caution

Do not under any circumstances use chemicals, brushes, rough cloths, high-pressure cleaners or steamers to clean the glider, as these can damage the fabric coating and weaken it. The glider becomes porous and loses braking strength.

Do not under any circumstances put the glider in the washing machine. Even if washing powder is not used, the glider would be badly damaged by the mechanical action of the machine. Do not put the canopy into a swimming pool - chlorine will damage the fabric. If you have no choice but to rinse the glider, e.g. following a landing in the sea, gently wash it down inside and out with fresh water. Frequent rinsing accelerates the aging process. ■

10 Repairs and Inspections

Type designation

Fresh Breeze paragliders have an exact identification on the underside of the stabilo lines or on the centre rib, which is obligatory for all paragliders. The information required is set out in the airworthiness requirements.

It is helpful to provide the type designation of the paraglider if you are contacting your Fresh Breeze dealer with any queries or ordering replacement parts or accessories, to ensure accurate identification.

Repairs

Fresh Breeze workshops

All repairs and servicing should be carried out by a Fresh Breeze-authorized workshop or directly by Fresh Breeze. Fresh Breeze workshops have trained staff, original Fresh Breeze parts and the necessary know-how, all of which will ensure top quality.

Small repairs to the glider

You can repair small tears in the wing yourself using self-adhesive sail material, provided that the tears are in places which do not bear heavy loads, are not at the seams and are no bigger than 3cm.

Regular inspections

The following parts and materials must be inspected regularly for damage, abrasion and correct operation, e.g. after landing:

- Risers and quick-links
- Lines
- Fabric

Lines

Measuring the length of the lines is part of the regular paraglider inspection. The lines must be measured with a load of 5kg, in order to ensure reproducible results for a comparison with the lengths in the check sheets.

The lines have a considerable influence on flight behaviour. Correct line length and symmetry are also important for performance and handling. Fresh Breeze therefore recommends an inspection every 50 to 100 hours or once a year.

Lines age and lose strength even if the paraglider is used infrequently or not at all. This can affect the safety and function of your paraglider. Signs of wear are slight bumps or changes in flying characteristics. The lines must then be replaced immediately. Use only inspected and approved lines, which can be obtained through Fresh Breeze.



Caution

A damaged line can result in loss of control of the glider. Always replace lines which are damaged.

If you need to replace damaged or worn-out parts, use only original parts or approved parts from the manufacturer.



WARNING

Do not under any circumstances use knots to shorten the lines. Any knot will weaken the line considerably and may cause the line to break in case of high load.

The overhand knot and bowline knots described are permitted only for connecting the main brake lines/brake handle.

Inspection

General

Failure to observe the inspection periods shall render invalid the certification and warranty. A properly completed logbook with details of all flying and training will help you to comply with these periods.

Inspection periods

In Germany, Fresh Breeze gliders must be inspected as follows (check the situation in your country):

- A) Gliders used by schools and commercially must be inspected (the same as the 2-yearly check) every 12 months from the purchase date.
- B) Gliders for personal use (not used commercially) must be inspected at least every two years from the purchase date.
- C) The glider must be inspected after 150 hours of use (including ground handling) if this occurs prior to the period given in A) and B) above.
- D) During the annual check of the complete XCitor the inspector may decide that the X-Wing Evo must be by the manufacturer even if the 2 years aren't over.

Ground handling time must be at least doubled when calculating the total hours of use because of the increased wear and tear on the glider.

Validity of inspection

It is very important that your glider is serviced at the required intervals throughout its entire life. In order to benefit from Fresh Breeze's warranty:

- you must have your paraglider inspected by Fresh Breeze or an inspection agent authorised by Fresh Breeze
- the documentation and the result of the inspection must be clearly identifiable (date and place / name of the inspector) and be entered near the glider information/certification sticker.

Inspection by the pilot

Under § 14 para. 5 of the German Aeronautical Products Investigation Order (LuftGerPV), pilots in Germany are able to carry out the inspections themselves or appoint a third party to do so (e.g. manufacturer/importer), provided that the requirements are all fulfilled. However, if this is done, the liability and warranty of Fresh Breeze GmbH will lapse.

The German association DHV recommends that inspection is carried out by the manufacturer/importer or by an inspection agent authorised by it and approved by the DHV. ■

11 Appendix

Fresh Breeze website

Fresh Breeze has a comprehensive website, which provides additional information about the X-Wing Evo and many other issues related to paratrikes. Fresh Breeze's website is the first port of call for Fresh Breeze's worldwide following:

www.fresh-breeze.de

On Fresh Breeze's website, you will find an extensive range of accessories for your paratrike, useful products for pilots, as well as additional information and accessories for your X-Wing Evo.

These websites and their content are provided for your use. The content of Fresh Breeze's websites has been made available for your use on an "as is" and "as available" basis. Fresh Breeze reserves the right to alter the websites at any time or to block access to them.

Product registration

Registration of Fresh Breeze products is easy and gives you many advantages. In addition to important safety notices, you will receive advance information about, e.g. new products, upgrades, events and special offers.

If you would like to receive this, please register your name by sending an email to us:

fresh.breeze@t-online.de

Addresses

Fresh Breeze GmbH & Co Kg

Langer Acker 11
30900 Wedemark / Bissendorf
Germany
Tel.: +49 (0) 5130 37699-22
Fax: +49 (0) 5130 37699-44
Email: fresh.breeze@t-online.de
www.fresh-breeze.de

Air Turquoise SA

Route du Pré-au-Comte 8
1844 Villeneuve
Switzerland
Tel.: +41 (0) 219 6565-65
Fax: +41 (0) 219 6565-68
www.para-test.com

DULV

Mühlweg 9
71577 Großerlach-Morbach
Germany
Tel.: +49 (0) 7192 93014 - 0
Email: info@dulv.de
www.dulv.de

EAPR

European Academy of Parachute Rigging
Marktstr. 11
87730 Bad Grönenbach
Germany
Tel: +49 (0) 8334 - 534470
Fax: +49 (0) 8334 - 534469
Email: info@para-academy.eu
www.para-academy.eu

DHV

Miesbacher Str. 2
Postfach 88
83701 Gmund am Tegernsee
Germany
Tel.: +49 (0) 8022 9675 - 0
Fax: +49 (0) 8022 9675 - 99
Email: dhv@dhv.de
www.dhv.de

Owner's Manual Versions

Version 2.0

Date: 02.10.2013
Second version for new X-Wing Evo
paraglider

Maintenance and Service Booklet

In addition to this Owner's Manual, this Service Booklet includes the Service Schedule for your paratrike. This booklet contains important information on Fresh Breeze service requirements and lists the paratrike's figures. The Service Booklet also includes check-and control sheets for. We recommend that you keep the Service Booklet with your paratrike at all times.

Repairs

Every repair exceeding the following described maintenance procedures should be carried out only by Fresh Breeze or by people authorized by Fresh Breeze. Otherwise there will be no warranty.

Location of signboards and frame number

The Fresh Breeze-XCitor signboard is located close to the frame number on the rear side of the main frame close to the fork.

Unit number of the rocket and the recovery chute are on the recovery system itself. The expiry date of the recovery system is there as well.

12 X-Wing Evo

Glider details

Size:	Colour:	Serial number:
Check flight (date): _____		
Mark and signature: _____		

Pilot details / Proof of ownership

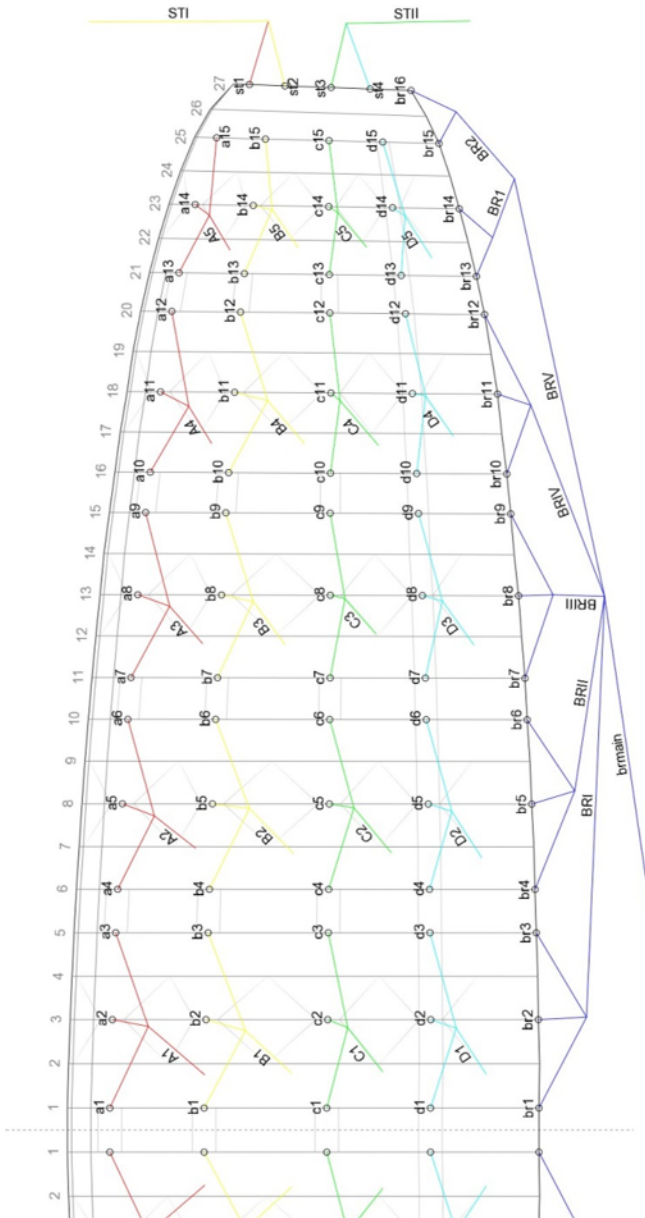
1. Owner	
Name:	
Address:	
Phone:	
Email:	
2. Owner	
Name:	
Address:	
Phone:	
Email:	
3. Owner	
Name:	
Address:	
Phone:	
Email:	

X-Wing Evo – Inspections and repairs overview

Date	Work carried out	General condition on delivery	Completed by (Name)	Stamp and signature

Line Layout

Use this template in case you have to order spare parts



Material list

Description	Article Code	Material	Dimension	Finish	Manufacturer
Quick Link (Carabiner)	8253406	A4-AISI 316	ø6,0mm	Stainless	Marinetch
O-Ring (Carabiner)	0468015;25 [Würth]	Perbunan 70	15 mm x 2.5 mm		Würth GmbH
Lines (Main - 1. Level)	TSL 380 TSL 280 TSL 190	Technora/PES	ø2,2mm ø1,8mm ø1,55 mm	Sleeve Polyester	Liros
Lines (Top - 2. Level)	TSL 280 TSL 220 TSL 190	Technora/PES	ø1,8mm ø1,65mm ø1,55 mm	Sleeve Polyester	Liros
Lines Brake Line Main Brake	TSL 190 TSL 220 Kite Line (300kg)	Technora/PES Dyneema	ø1,55mm ø1,65mm ø2.5mm	Sleeve Polyester	Liros Daegu Yujik (Korea)
Fabric Top Skin	3RS ME 2RS ME	Nylon	41 g/m² 38 g/m²	coated	Gin Gliders Inc.
Fabric Lower Skin	2RS ME	Nylon	38 g/m²	coated	Gin Gliders Inc.
Fabric Ribs	3RS FM	Nylon	41 g/m²	coated	Gin Gliders Inc.
Fabric D-Ribs	3RS FM	Nylon	41 g/m²	coated	Gin Gliders Inc.
Fabric H-Straps	3RS FM	Nylon	41 g/m²	coated	Gin Gliders Inc.
Thread	Serali 60	Polyester	150D/3"	impregnated	Amann
Bridle Loop	M21030 NYLON 13mmHBT	Nylon	13 mm HBT	-	Seokwang (Korea)
Bridle Rib Support	W420 [ø2420-X15]	Nylon	180 g/m²	Double laminated with polyester films	Porcher Sport
Rigid-Rods (Leading Edge)	ID Gin Gliders Inc.	Nylon	ø 2,5 mm	-	Gin Gliders Inc.
Trailing Edge Band	Mylar TAPE (F6382)	Polyester	25 mm	Pes fabric laminated film	Porcher Sport
Binding Tape (Leading Edge)	10mm Tape	Nylon	10mm	-	Seokwang (Korea)

Load and shock test report

para-test.com



paragliding by air turquoise

Air Turquoise SA
Rte du Pré-au-Comte 8 | CH-1844 Villeneuve
tel. +41 21 965 65 65 | mobile +41 79 202 52 30
info@para-test.com

LOAD TEST REPORT EN 926-1:2006 & LTF 2. DV LuftGerPV §1, Nr. 7c

The model describe hereafter is in conformity with the load and shock tests carried out by:

Air Turquoise SA, official test laboratory of Switzerland

Manufacturer:	Fresh Breeze GmbH & Co. KG
Model:	X-Wing Evo
Type:	28
Maximum weight in flight:	383 kg

SHOCK TEST 1200 daN

The model had no appearances damage to question whether it's airworthiness.

MECHANICAL RESISTANCE TEST

The model had been tested to 6G of it's total weight in flight during 3 seconds.

Payerne, September 7th, 2013
Air Turquoise,


Alain Zoller



Prepared by BEK
Rev. 1 01.09.2009

Air Turquoise SA – Certification of Paraglider equipments
Paraglider EN 926-2:2005 / EN 926-1:2006 – Rescue EN 12491 – Harness EN 1651

No 71.7.2

13 XCitor

Weight and balance

Procedure

The trike must be ready to fly with all equipment as described in the equipment list, but with no fuel on board, no pilot and no payload.

If there is fuel left in the tank it must be taken into account within the calculation.

As displayed in the picture the trike must be standing on three scales horizontally. The upper side of the engine mount is used as a horizontal reference.

Then the C.G. calculation can be done as following:

Weight at front wheel	F_v
Weight at rear wheel on the right side	F_{hr}
Weight at rear wheel on the left side	F_{lr}

Distance between glider attachment point and front wheel	L_v
Distance between glider attachment point and rear wheels (only longitudinal component)	L_h
Distance between CG and glider attachment point (positive, if CG is behind the attachment point)	Δs

Δs can be calculated as following:

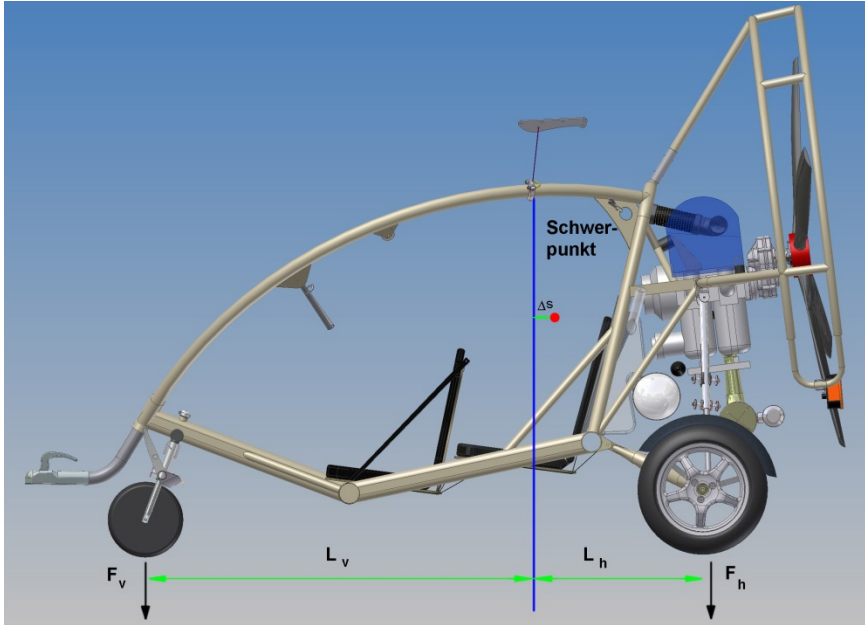
$$\Delta s = \frac{F_v + F_{hl} + F_{hr}}{L_h * (F_{hl} + F_{hr}) - L_v * F_v}$$

This distance must be smaller than ± 50 mm. Otherwise the glider attachment points must be relocated until the XCitor will hang nearly horizontally. This can be achieved by loosening the 2 M6-screws on each side, moving the clamps until they have the correct position and tightening the screws again.

The correct position must be confirmed with another measurement of the wheel loads and / or with a hang test.

Weight and balance sheet

Type: XCitor	Serial No.:
Call sign:	Production date:



Loads		Torques	
F_v	_____ kg	$\times L_v$	_____ kgmm
F_{hr}	_____ kg	$\times L_h$	_____ kgmm
F_{lr}	_____ kg	$\times L_h$	_____ kgmm

$$\Delta s = \frac{F_v + F_{hl} + F_{hr}}{L_h * (F_{hl} + F_{hr}) - L_v F_v}$$

This distance must be smaller than ± 50 mm!

The empty weight is measured including equipment according to the equipment list from _____ including cooling agent and _____ l fuel.

Location, Date: _____ Stamp/ Signature of Inspector: _____

Equipment list

XCitor Prod.-No:	Call Sign:
Engine Hirth 3503, No:	Propeller:

1. Speed indicator
2. Altimeter
3. Compass
4. Radio
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

Modify list if required.

Remarks:

Location, Date: _____ Stamp/ Signature of Inspector: _____

XCitor trike – Maintenance overview

Operation time [h]	Check	Date	Inspector	Remarks
25	25-h-Check			
50	25-h-Check			
75	25-h-Check			
100	100-h-Check			
125	25-h-Check			
150	25-h-Check			
175	25-h-Check			
200	100-h-Check			
225	25-h-Check			
250	25-h-Check			
275	25-h-Check			
300	100-h-Check			
325	25-h-Check			
350	25-h-Check			
375	25-h-Check			
400	100-h-Check			
425	25-h-Check			
450	25-h-Check			
475	25-h-Check			

500	100-h-Check			
525	25-h-Check			
550	25-h-Check			
575	25-h-Check			
600	100-h-Check			
625	25-h-Check			
650	25-h-Check			
675	25-h-Check			
700	100-h-Check			
725	25-h-Check			
750	25-h-Check			
775	25-h-Check			
800	100-h-Check			
825	25-h-Check			
850	25-h-Check			
875	25-h-Check			
900	100-h-Check			
925	25-h-Check			
950	25-h-Check			
975	25-h-Check			
1000	100-h-Check			

More about Fresh Breeze

fresh-breeze.de

