

Manual Flyke



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Views



Manual Flyke

Introduction

Dear Pilot,

We wish you much fun with this extraordinary flying machine.

The certification is planned for the Monster 110 and the Solo 122.

For safe flying you should read this manual carefully, make yourself familiar with the Flyke and its possibilities.



The Flyke is a multi-purpose-machine. It can be used in mainly 3 modes:

- a high performance recumbent bicycle (without motor)
- as a transportation vehicle for the complete flying equipment
- as a trike for powered paragliding.

In addition the Flyke could be used as a powered ground vehicle. This mode is not legal on public areas. Also it may cause instability. Therefore and due to legal reasons we designed the steering handle and the motor handle not to be operated at the same time.

This manual refers only to the Flyke itself. We assume that the reader is already familiar how to operate the motor.

Use of an existing motor

The Flyke can be used with already owned Fresh Breeze-engines. But some things have to be considered:

You can use a 122cm-prop for maximal performance or 110 cm if you are not too heavy (less than 80 kg) and if you want to reduce the width of your Flyke as much as possible.

The motor is attached to the Flyke using the “Multi-Purpose-Tubes”. Hooks can be put into their upper ends. They are locked with spring pins.

In the front side of each tube a 5 mm-hole has to be drilled which is roughly 160 mm far away from the upper end of the tube. This hole has to accept the steel pin inside the white plastic clips on the lower engine mount strut of the Flyke.

In addition cable of the gas handle has to be replaced with a 20 cm longer one. The longer cable is attached with only one cable binder and a distance piece (made from 20 mm rubber tube) on the left front end of the gas tank strut.

Setup

The Flyke is a front driven recumbent bicycle. Its steering system consists of elastomeric blocks behind the seat. This allows the seat to lean into the curves. Centrifugal side loads can therefore be compensated.

The engine mount is on the rear end. It can carry a standard backpack paragliding motor.

Adjusting the Length

In order to adjust the length of the Flyke the 2 orange screws have to be loosened. Then the square tube can be moved into the required position, and you have to tighten both screws again.

The handle of each screw can be turned relatively to the screw by pulling it a little bit, turning it and letting it snap back into its original position.

To maximise ground clearance turn the handle into a back/upright position.

Shortening of the Flyke is easier if it is tipped onto the rear side, the gravity helps you then.

To make it longer just take place and use your legs to move the front part.



For easier transportation the Flyke can be separated into a front and a rear unit just by pulling the square tube completely out of the seat structure. Then the whole brake lever and gear shift unit can be taken off from the steering lever by loosening the clamp screw on the side of the front brake lever with a 4 mm-Hex key.

Adjustments for different pilot weights

The Flyke has to push rods which have a horizontal in-flight-position. They stabilize the paraglider and push it forward during take off.

On these push rods there is a bushing which is connected via a steel cable with the seat of the Flyke. It has an eyelet with the carbine for the steel cable and a Nylon loop for the main carbine.

The bushing can be fixed in one of three positions with a screw. The front position raises the front end of the Flyke during flight, the rear lowers it.

Pilots with a weight of 65 to 85 kg should use the center position, from 55 to 65 kg the rear, and from 85 to 100 kg the front position. The center position is acceptable even for these weights, but it is more comfortable to use the other ones.

If the bushing is moved into an other position the black pull-up push rod has to be moved accordingly. It is locked with the same screw.

Steering

Steering of the Flyke is done using a lever on its right side. Pulling it back (and yourself to the right) makes it curve to the right, pushing it forward (and yourself to the left side) makes it turn left. With a little training the upper part of the body can be used to steer it via weight shift. The steering lever just supports the movement. Moving the body into the curve allows higher cornering speeds without roll-over. If the Flyke starts to tilt, slow down, steer straight and move your body into the curve.



Braking

The Flyke has two independent brakes systems: A cable operated roller brake at the front wheel, and two hydraulic actuated rear drum brakes.

As a result of the low center of gravity the Flyke can't tilt even if the wheels are blocked. So the maximum deceleration can be higher than regular bikes.

Front Brake and Gear Shift

The integrated gear shift / brake hub of the Flyke has a freewheel function. To snub one pedal can be moved into the best position for maximum force.

The front brake lever is on the right side of the Flyke on the steering lever. Here is an set screw if the length of the brake cables has to be adjusted.

The roller brake precisely controlled even under wet conditions. Unlike regular brakes it works with steel friction elements and has to be lubricated from time to time! The hub has a grease hole on the left side which is sealed with a little grey plastic closure.

For further information please refer to the Shimano brake manual.

The 7-speed gear is operated with the grip shift lever, which is on the right side of the Flyke at the steering lever as well. There the actual gear is displayed.

As already mentioned, the whole unit with the grip shift lever and the brake handle can be taken of after loosening one screw of the brake handle, if the Flyke has to be separated into 2 parts.

When the Flyke is re-assembled, check the right position of the cables!

Rear Brake

The rear brake is a hydraulic operated drum brake. The rear brake lever is underneath the left seat tube.

The brake system has a lifetime filling of hydraulic fluid which usually never has to be replaced or refilled.

If the brakes have to be adjusted there are 3 ways to do so: At the brake lever there is a little hex set screw which adjusts the distance



between brake lever and the brake piston.

And at each wheel cylinder there is a thread under the rubber sealing. The length of the push rod can be adjusted by taking the brake cylinder off after removing the 4mm-E-rings.



The right setting makes it possible to lock the rear wheels, but if the brake lever isn't actuated both wheels have to run free.

Operating Modes

The already mentioned different operation modes are the result of different configurations of the motor, the push rods and the paraglider.

Bicycle Mode

If the Flyke shall be used just as a recumbant bicycle, everything can be removed which is not necessary for biking: The motor and the push rods with cables. The foot rests can be moved to an upright position.



Flight Mode

When the Flyke is used as a paraglider trike, the engine has to be attached in the right manner, the push rods have to be moved into an



upright position, the paraglider has to be attached to the main carabines, the recovery system has to be installed, and it is

recommended to move the foot rests into their horizontal position. During long flights this is more comfortable, plus the risk of hurting the feet during take off or landing is much smaller.



Possible Combinations

For short distances it is sufficient to move the foot rest upright. Now the regular pedals can be used.

In addition the push rods can be moved downwards without removing them.



From a technical point of view it seems to be possible to use the motor on the ground as well. But this is not an intended use and will be covered by no warranty. And it may be not legal depending on the specific regulations of your country. It may cause instability as well. So we designed the Flyke steering handle and the motor handle not to be operated at the same time.

Assembly of the Motor, the Pushrods, the Paraglider and the Recovery System

The motor is attached with 2 hooks on the upper engine mount strut. These hooks sit in the upper ends of the “Multi-Purpose-Tubes” at the motor front. They are locked with spring loaded pins. Check these pins very carefully: They have to be completely moved out!

The lower engine mount strut has 2 clips which have to surround the “Multi-Purpose-Tubes”. The steel pins in the clips have to sit in the corresponding holes in the tube. This connection is secured with a short tie belt as shown on the picture. So the engine can't come loose accidentally.

The throttle cable must be brought through the “A”-strut of the Flyke. During long flights or during bike tours it can be put into the hole at the end of the steering lever.



Being alone it is easier to put the engine onto the engine mount by raising the front wheel of the Flyke, until the engine mount is low enough to take the motor hooks. So the engine can be easily attached.



The two pushrods sit in each side of the upper seat tube. They are locked against being accidentally pulled out by spring loaded pins. These pins work as well as a hard stop when the struts are moved from the flight into the drive position. Please avoid excessive loads in the end positions in order not to overload these pins and their seats.

The upper position of these struts is determined by the length of the white steel cables during the flight. The lower end of the cables is attached with a screw carbine at the lower seat strut. If both push rods are taken off for biking these carbines can be opened and the cable removed as well.



The two 8mm-bungee cords hold the push rods in their upright position. They are hooked into the rear eyelets on the push rods and onto the most upper rope on the front side of the motor.

The pulling-up help shortens the A-risers during take-off as long as the paraglider is behind the push rods. During biking the stainless steel hook of the orange rising line can be hooked into the eyelet of the push rod, and the rising line can be shortened by pulling the 6mm bungee cord out of the rear side of the push rod. This bungee cord has a plastic hook which can also be put into the eyelet of the white steel cables.



For flying this rubber cord must be unhooked and the rising line must be completely pulled out of the push rod. The stainless steel carbine has to be hooked into the A-line carbine. Please check that the riser is running free! This means, that it doesn't run accidentally around the throttle cable or so.



The throttle cable must be outside the white steel cable during flight! It is more comfortable to unbutton the brake line handle from the risers and to put it over the push rod before taking off. There you can easily pick it up after taken seat and having buckled up.



The recovery system can be mounted on the safety belt on the breast or on the head rest behind the head. Most important is that its handle can be reached easily. The V-Line is attached into the main carabines where the paraglider is attached as well. It must run free of other parts, but it may run under the 8 mm rubber cords which are used to hold the push rods upright.

The paraglider is hooked into the main carabines so that the A-lines show to the front and the D-lines to the back, if the risers are in the upright flight position. This is the same as flying without any motor. In order to keep the lines sorted we recommend to tape a big plastic cable binder on to the outside of the cage as shown in the picture. Then the lines can be clamped into this place.



Take-Off

In this manual we only describe how to operate the Flyke. You should be already familiar with your motor.

General Information

The Flyke is smaller than regular trikes. Otherwise it wouldn't fit to the width of sideways. If the paraglider pulls to the side the Flyke can easier roll over than wider standard trikes. Therefore it is necessary to keep the paraglider more or less vertical above the Flyke, and to let it not pull more than 30° to the side.

The „Power-Steering-System“

If the paraglider moves to the side during it comes up, it must be corrected with the brakes, and the trike must be steered under the paraglider. This is only possible if the ground speed of the trike is high enough. So the maximum wind speed must be much smaller than the take-off speed of the used paraglider.

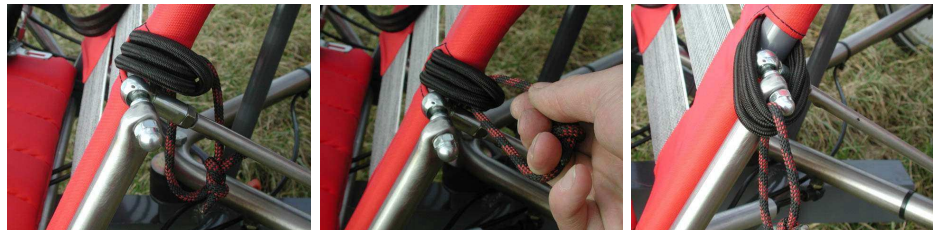
Fresh Breeze recommends to fly only, if the wind speed is slower than 10 km/h. If the conditions are gusty we don't recommend flying at all.

Regular paraglider trikes can be steered with the feet during takeoff. If the paraglider goes to the side the trike can follow. Due to the front drive the Flyke cannot be steered with the feet. But the hands have to control the paraglider. So Fresh Breeze developed a “Power-Steering-System”. The length and the geometry of the push rods are designed to steer the Flyke if the paraglider pulls to the side. The whole front of the Flyke is pulled to the side as well and makes the Flyke move to the same side.

As the paraglider provides much more force than required for steering the movement of the steering system has to be limited by a bungee cord on the left side of the seat. A rope handle is used to pull the rubber loop around the cap nut.

Well trained pilots may take off without this help, but this requires much experience with the paraglider as the Flyke follows even the smallest movement of the glider.

Fresh Breeze recommends to use always the rubber loop in the flight mode.



The „Pulling-up Help“

The Flyke is equipped with the tried and proven “pulling-up help” like it's predecessor, the Skip 1.

This makes the take-off procedure much easier as the A-risers must not be manually shortened by the pilot. When the Flyke starts to roll the paraglider comes automatically above the Flyke.

For take-off the 6 mm rubber cord must be unhooked and the rising line must be completely pulled out of the push rods. The stainless steel carbine must be hooked into the carbine of the A-lines. Check the clearance of the riser, e.g. it must not run around the throttle cable accidentally.

During flight the throttle cable must be outside of the right steel cable!



The correct length setting of the rising line is adjusted by pushing or pulling the free end of the orange line through the black push rod. If all lines are held in the vertical flying position the orange line should just be tight. Secure the free end at the black push tube with a knot, wrap the end around it and secure it with a piece of Velcro. If you're using a Silex, the correct length including the carbine is 63 cm.

Seat Belt

The Flyke is equipped with a 4-point seat belt like some sport cars. The belt lock is located in the middle of the 4 belts, each length can be adjusted individually.



Start Check

The check procedure can be separated into two parts:

- A check of the complete mechanical set-up, especially all joints, screws and rubber elements. Look for damage and check for tight seats.
- And the check of the correct start configuration.

The first check is the same as you usually do with your motor, but now the complete Flyke is included.

The second check includes this points:

- Is the paraglider laid out properly and connected in the right manner with the Flyke?
- Propeller clear?
- Are all lines clear?
- Are they all in the plastic cable binder on each the cage side?
- Are the push rods in their upper position?
- Are the brake lines free and the handles on the push rods?
- All carabines closed?
- Throttle cable outside the right steel cable?
- 6mm rubber cords unhooked?
- Are the bushings on the push tubes in their correct position according to the pilot weight and locked with a screw?
- Are both orange rising lines completely pulled out, adjusted to the right length and hooked into the carbine of the A-risers?
- Steering lever blocked with the rubber loop?
- Foot rests in the horizontal position?
- Fuel tap open?
- Choke?
- Main switch on?
- Buckled up?
- Feet in the foot rest?
- Runway clear?

There are several possible ways for the throttle cable. We recommend to take it under the right arm.

Take-Off Procedure

Before you start the paraglider must be layed out behind the Flyke, and all the lines have be connected correctly to the Flyke. The Flyke has to be pulled as much forward as possible. The lines must be more or less straight. If the Flyke is too close to the rear edge of the paraglider, the glider will get a sudden impulse when you take off.

This may lead to high peak loads in the glider, reducing its lifetime, as well as to an overloading of the push rods: Their steel cables are not supporting horizontal loads, only vertical loads!

A horizontal overload of the pushrod may result in a damaged seat by bending the upper horizontal seat strut!

When you are buckled up and after having the wind checked (always take off and land against the wind!!) the throttle lever is taken into the right hand (cable under the right arm or close to its outside, both is possible), and both brake handles are taken from the pushrods into the hands.

Now the engine can be started. If you don't have an electric starter you can do so before you take seat, but take care that you always stand in front of the seat so that the Flyke can't roll.

Now open the brakes, give gas gradually and watch the paraglider carefully by turns over both shoulders.

If the paraglider doesn't come up symmetrically correct it immediately with the brakes. If this is no longer possible stop the start! Shut off the engine and pull the paraglider with the brakes. If the paraglider is not laying symmetrically behind the Flyke on the ground, you can open it and lay it down in the right manner by giving gas for a short moment.

As the Flyke is controlled on the ground just by steering the paraglider it is absolutely important to control the paraglider precisely all the time. Otherwise stop the start!

Once the paraglider is over the Flyke it may be necessary to brake it a little bit, otherwise it may go forward too much and drop over.

Remember: Curves are made just with the paraglider, the Flyke will follow. Look up very often, the start area must be free anyway.

After a few seconds with full gas the Flyke will take off and fly. Depending on the wind the take-off distance will be ca. 3 – 20 m.

Flight

Flying the Flyke is very similar to flying a standard backpack motor system.

But due to the additional rubber elements vibrations are much less than usual.

During long flights the throttle lever can be clamped in the required position, and put into the hole in the steering lever. To maintain a straight flight it may be possible to trim the paraglider correspondingly.



Landing

Landing the Flyke is much easier than with a regular backpack motor as the forward speed doesn't play an important role. But it is essential to land straight against the wind. If the Flyke is already very slow and the glider would pull to the side it is no longer possible to drive under the glider. To minimize the potential risk of roll over the paraglider has to be controlled until it comes completely down!

The Flyke is tested up to sink rates during touch down up to 2 m/sec which it can withstand without damage. But this wouldn't be very comfortable.

So the paraglider should be flared as you do with a standard backpack motor. After the landing the motor should be switched off so that it can't blow into the glider. You can switch it even off when still airborne.

Ground Transportation of the Paraglider with the Flyke

The folded paraglider can be stowed away behind the seat. Just put the transportation sack into the gap between seat and A-strut. The paraglider lays on the rear axle.

Moving the push rods down gives you an additional lateral hold. The 8 mm rubber cords may be used fix the sack in addition.



Something about the physical laws behind it

The Flyke design is focused on high speed in curves and the possibility to steer it via the paraglider during take off. Another issue is the simple and lightweight design of the front wheel unit.

This leads to a negativ caster length – a pushed and not pulled front wheel. Any centrifugal load due to fast cornering will therefor force the Flyke to steer into that curve causing even higher centrifugal loads. This will de-stabilize its run.

As we still have the need for a stable straight ahead run we use 2 gas operated compression springs. They align the front wheel with the rest of the flyke and compensate centrifugal loads.

Their force keeps constant at any speed, but the centrifugal load will increase with rising speeds. So at a certain level the de-stabilizing centrifugal load will become higher than the stabilizing spring force.

This speed is depending on the pilot weight, the length of the Flyke and the wear (internal pressure) of the gas springs and may be between 35-40 km/h.

At such high speeds the Flyke may run without any problems for a certain time, but even small inputs like potholes or so may cause the Flyke to toggle from one side to the other and finally roll over, especially if the driver isn't experienced and prepared to react.

Higher spring forces would increase this critical speed, but also make the Flyke less handy at usual speeds. As it is intended to be used as a recumbent bike we found a certain compromise between high speed stability and good handling.

But this leads to the fact that the Flyke is not designed to be driven with engine power on the ground! As the direction of the prop blast changes with the steering angle as well this is also de-stabilizing the whole system.

On steep hills (on private area only!) the engine may be used at idle speed to support the pedaling, but nor more than that!!!

Maintenance

There's no special maintenance required for the Flyke. Clean it like any other bicycle. Avoid aggressive chemicals and steam cleaner as moisture may be pressed through ball bearing sealings.

The roller brake has to be lubricated from time to time according to it's specific manual. If the brakes don't work correct they may have to be re-adjusted.

The rubber joints have a critical function in the steering system so they have to be checked carefully for cracks and delamination.