



FLYLINE

INSTRUCTION MANUAL



Thank you for purchasing a PhotoShip One FlyLine cable cam system. The FlyLine is a point to point cable cam system that is self powered and easy to setup and operate. Most professional cable cam systems require tremendous amount of work to setup on location and require heavy expensive equipment that can take a box truck to haul.

FlyLine has fully adjustable cable pulleys and drive system as well as capability to mount up to four Kenyon KS4 stabilizing gyros for rock solid smooth footage. In most cases however, only one or two Kenyon gyros are required. These systems are point to point (AB) type cable cam systems which use a single cable anchored between two points. They require no heavy expensive and energy hungry ground based winches. The FlyLine systems employ a DC motor on the trolley to "drive" on the cable. They are able to drive up a slope of slightly over 10 degrees at maximum weight of around 25lb. They can travel on a level slope at up to 60lb all up weight. Power is provided by on-board lithium polymer battery packs. It is possible to reach speeds of up to 40mph (60kph) on an unsloped cable or move as slow as 39" per minute (1m per minute) for smooth slow motions. *

Braking is done electrically and is known as a Asynchronous Regenerative Braking (ARB). ARB is accomplished with our industrial robot motor driver which means you're putting power back into the battery when you decelerate or apply the brakes. Much like newer electric automobiles now do. The results with ARB are staggering. Putting as much as 50% of the power back into the battery for each acceleration/deceleration pair. The benefit is of course is greater duration/ distance from a set of charged batteries.



FlyLine is able to be controlled wirelessly via a joystick controller with a range of 1km (far greater than you'll run a FlyLine). The camera can also be connected to a wireless video system to send and display camera video feed in real time to an LCD at the camera operator station.

A common question we get is 'How long can it run on a battery?'. The answer is not so simple. You must consider the FlyLine like you would an electric car. The top concern with electric cars is not how long they last, but rather what is the maximum distance it can travel on a charged battery. The same is true with the FlyLine. It is possible to run a distance of 7-10 miles on a single charge. This is of course assuming a level cable and moderate accelerations.

The FlyLine can accommodate a Canon 5D/7D, Nikon D4, Canon C300, Sony FS100/FS700, Red Epic or larger cameras when equipped with a Ronin or MoVi gimbals. One controller is used by a trolley drive operator and one controller is used by the camera operator for composing the shots.

Kenyon KS4 gyros are recommended for extremely smooth wobble free video. We are an authorized Kenyon dealer and can supply these gyros.

This system includes 600' of 8mm Dyneema rope. It is rated at 12,000lb breaking strength. When stretched out to 100m and the FlyLine hung on the Dyneema expected tension on the rope shall be less than 500lb leaving a safety factor of 20. We have tested the FlyLine on a maximum length of 500m with no troubles.

Large trees and scaffolding and light poles or other firmly fixed objects can be used to anchor to provided the objects can withstand 300-1,500lb of pulling tension at the rope connection point (depending on cable length). The longer the cable length the higher the tension on the cable must be. At a length of 150m it should be tensioned up to 1500lb. Of course it is REQUIRED that a qualified rigger calculate the cable and attachment loads and rig as required.

Specifications

- Size: 100 x 85 x 25 cm (Including Ronin-M gimbal)
- Weight: 7kg (with battery and gyro – without camera)
- Max. camera weight: 8kg
- Max. speed: 60kph (40mph)
- Max. cable slope: 20% grade (12 degrees)
- Operating voltage: 12-25vdc
- Max amps: 50A
- Regenerative braking: Yes
- Motion Control with auto end stop braking: Optional
- Gyro stabilized: Optional

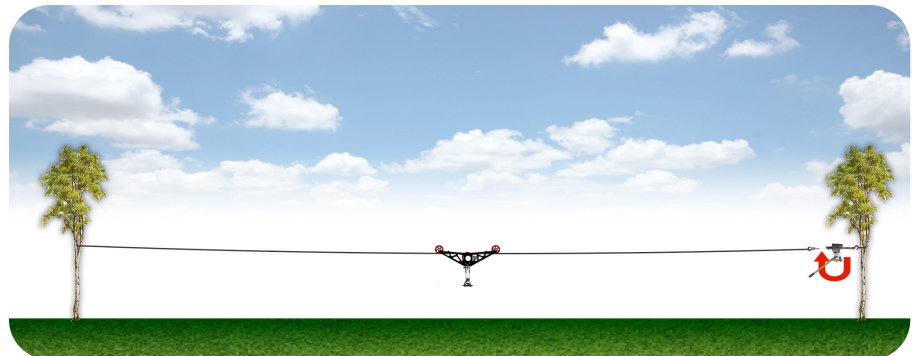


Cable Setup

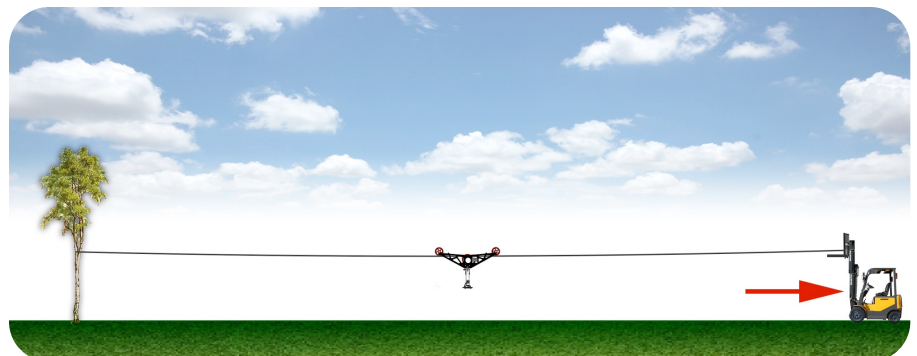
To operate the FlyLine you must first run a length of cable between two anchor points. As previously mentioned, be sure the anchor points are sufficient strength to support the tensioned cable. To tension the cable between two fixed points like trees or similar you can use a 4 ton manually operated winch as shown to the right.



One end of the cable is attached to one anchor. The cable is run to the winch which is attached to the other anchor. The winch is cranked to apply the proper tension. As rule of thumb, the cable is tensioned properly when the sag at mid-span when loaded with the FlyLine is about 10' per 500' span.



Another method is to use one fixed anchor and one movable anchor. The movable anchor is usually a heavy duty scissor lift, forklift, crane, etc. In this manner you attach the cable to the fixed anchor and the movable anchor and 'drive' the movable anchor backwards to apply proper tension on the cable.



Dyneema/AMSteel rope will usually require re-tensioning once or twice after initial tensioning. This is normal and is due to it stretching slightly. Keep watch of the sag and as it increases re-tension the cable accordingly.



The FlyLine operates best and is most efficient when the cable slope is 5 degrees or less. The slope angle is measured from each anchor point. At angles greater than 5 degrees up to 11 degrees the FlyLine will consume much more power when traveling on the upwards slope and also when holding in position. Battery duration can be affected by as much as 2x when operating on cable slopes greater than 5 degrees. For this reason it is recommended to monitor battery voltages often or install battery voltage telemetry. If the battery voltage drops too low and the FlyLine is on a sloped cable, the FlyLine system will shut down and the result would be the FlyLine traveling down the line by itself due to the force of gravity. The FlyLine could impact the anchor point causing substantial damage.

As a safety precaution we have determined a great solution as an emergency stop. We recommend at about 30' from each anchor that you wrap a large sized beach towel around the cable one time and let the ends drape down. These act as emergency stops. In a runaway trolley scenario the FlyLine would impact the towels. The towels wedge in between the FlyLine frames and outrigger pulleys and bring the system to a quick stop without damage to the FlyLine. It is a rather simple but effective solution.

Always consult a qualified rigger before setting up the rope/cable. Be sure the anchor points can handle the projected tension load multiplied by a 5x safety factor.

Adjusting Drive and Outrigger Pulleys

The center drive pulley and two outrigger pulleys can be adjusted depending on the cable tension. Adjustment of the pulleys will cause the cable to be pushed harder or less hard against the main drive pulley. Since the main pulley relies on tension against the cable it is important to adjust the pulleys properly.

The outrigger pulleys can be mounted in one of three hole selections in the FlyLine side frames. The default is the middle position. To apply more tension on the drive pulley the outrigger pulleys should be placed in the lowest hole selection. For less tension on the drive pulley the outrigger pulleys should be placed in the highest hole selection.

For even more finite adjustment the motor/drive pulley can also be adjusted up or down. The screws for the motor plate are in slots and can support about 20mm of travel up/down. Simply loosen the motor plate screws and adjust the motor/pulley up or down and re-tighten the screws. Usually though, the motor can be left permanently near the middle of the slots with the outrigger pulleys being of sufficient adjustment.

There is no specific formula for determine how much tension the cable should have on the drive pulley but it should be just tight enough that with smooth application of about 75% power input in forward or reverse the drive pulley should not 'slip' on the cable.

If the tension is too tight, motor temperature may rise to very high levels. Be sure the rope tension on the drive wheel is at the best compromise between too loose (slippage) and too tight (hot motor temperature).

Keep in mind weather conditions will affect the amount of traction the drive pulley will have against the cable. If the cable has ice or snow on it, traction can be drastically reduced. Please inspect the cable prior to running in adverse weather and clear snow/ice from the cable prior to operation.

FlyLine Trolley Controller (for non-MoCo equipped. For MoCo equipped see MoCo manual)

The trolley controller uses only one of the joysticks and one the switches. The right joystick controls the FlyLine trolley motor throttle.

The joystick has a spring return and returns the stick to the center position when released.

When the stick is moved in one direction the trolley will move in a direction. When the stick is moved in the reverse direction the trolley will also move in a reverse direction. The speed at which the trolley moves is proportional to the stick deflection.

Above and to the right of the joystick is a 'Dual Rate' switch. This switch operates the motor at either full power for high speed operation or at a reduced power for slower operation. You may adjust the control response for slow speed dual rate by adjusting the D/R and Expo menu in the Spectrum controller. See Spectrum manual for details.



Powering up FlyLine

Proper installation of batteries and powering up of FlyLine is VERY important. Pay particular attention to the instructions to follow!

FlyLine is powered by Lithium Polymer batteries. It uses two 6-cell 22.2v 10ah batteries. Avoid letting the battery voltage drop below 3.2v per cell (19.2v total) under load while operating FlyLine. Plan to change the batteries when the under load voltage gets down to 3.3 volts per cell.

FlyLine, when properly configured, has an emergency power cut feature built into the motor driver. Emergency Power Cut is activated by placing Switch B on the DX6 controller to the '0' position. This is useful when working on the FlyLine, changing batteries, or simply to stop the FlyLine if you become confused on how to operate the throttle stick (yes, that happens). See the Motor Driver Setup Manual for details on how to configure the emergency power cut feature.

To power up FlyLine follow these steps (in order):

1. Turn on the transmitter controller.
2. Set the right joystick on the transmitter in centered position.
3. Power up the FlyLine by plugging in the battery
4. Wait at least 5 seconds before attempting to drive the FlyLine
5. The FlyLine is now powered up and ready for operation.
6. Apply throttle slowly in either direction to drive the FlyLine.
7. FlyLine is now ready for operation

To power down FlyLine follow these steps (in order):

1. Unplug the batteries from FlyLine.
2. Turn off the transmitter.
3. FlyLine is now powered down.

Charging FlyLine Trolley Batteries

Charging the batteries is very critical. The batteries that FlyLine uses are Lithium Polymer. When properly charged they are quite safe and provide substantial power to size/weight. FlyLine systems shipped after May 2015 are equipped with Imax touch screen chargers. The batteries included are 6 cell lithium polymer with balancing plugs. If you are unfamiliar with balancing charging lithium polymer batteries you **MUST** do a bit of reading and watching youtube videos on the subject. You will do well to fully understand the need for and methods of battery cell balancing.

FAILURE TO PROPERLY BALANCE CHARGE AND MONITOR CHARGING CAN RESULT IN FIRE OR EXPLOSION!

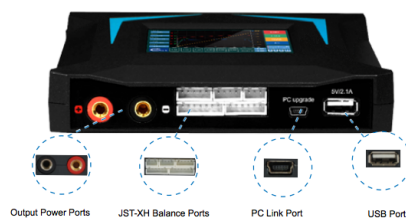


Charger Features:

- Intelligent charger designed for 1s-6s Lithium battery pack including Polymer Li-Ion and Cylindrical Li-Ion with capacity > 6000mAh
- Worldwide input AC power from 100-240VAC, 50-60Hz, USA AC plug
- Built in cooling fan to ensure charger long service life
- Safety protection
 - Over Voltage protection
 - Short Circuit protection
 - Output reverse protection
- Charging Current
 - 5.0 A standard charging rate
- Output: Varies based on cell voltage
- Max Power output: 150W
- Charging time:
 - $\text{Charging time} = (1.5 \times \text{Ah rate of the pack}) / 5.0\text{A charge current.}$
- Built in IC to cut off power automatically when battery is fully charge.
- Weight: 2.0 lbs 1.20z (940g)

X150 Fundamental Function

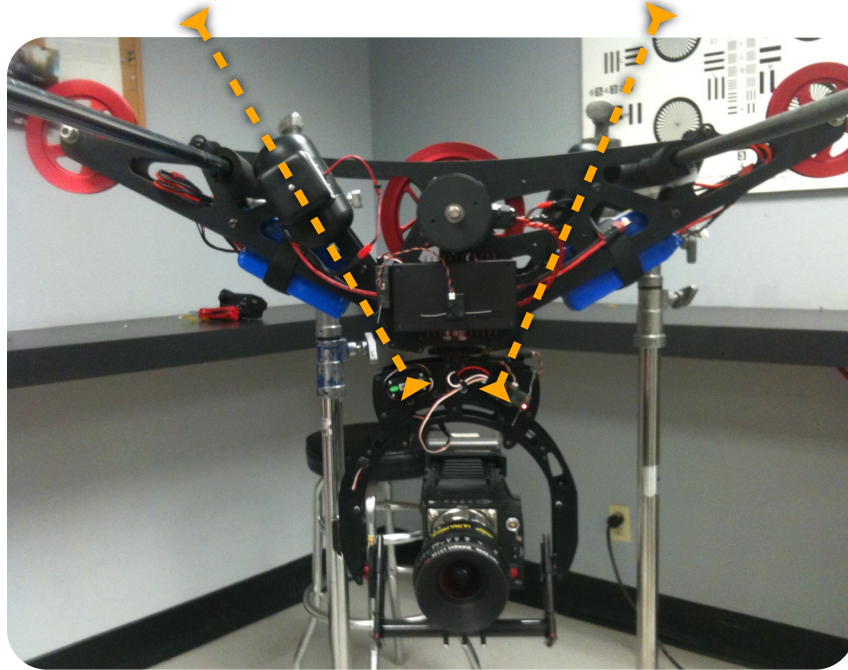
www.imaxrc.com/X150.html



Installing Kenyon Gyros



The FlyLine trolley can be equipped with Kenyon KS-2 or KS-4 gyros. The gyros have integrated power inverter and need only to be plugged into the small red connector on the FlyLine labeled 'GY'. The mounting screw of the gyro will attach to one of the FlyLine hexagonal spacers. One gyro is mounted on the side the motor protrudes from and the other gyro is mounted on the other side. It is important that the gyros be installed at the proper orientation. The gyros must be rotated about 20 degrees to one another for the best stabilization. See below.



We recommend using a separate battery to spool up the gyros to proper operational speed then install the batteries you will use to run the trolley. The spool up period takes about 10 minutes. The reason to use a separate battery is because the gyros will consume more power during spooling up than at normal operation and using a separate battery other than the main trolley batteries will extend the running time of the trolley.

Take care when handling the Kenyon gyros while they are in operation. Moving them too abruptly will cause the internal clutch to release. It is not a problem if the clutch releases as that is it's design but it is best to keep it to a minimum. Do NOT drop or handle the gyros roughly. They are finely built devices and can be damaged by rough handling.

Thanks for renting the FlyLine. Please contact us if you have any questions or concerns. Please complete the equipment checklist when packing the FlyLine for return. Return FlyLine to:

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