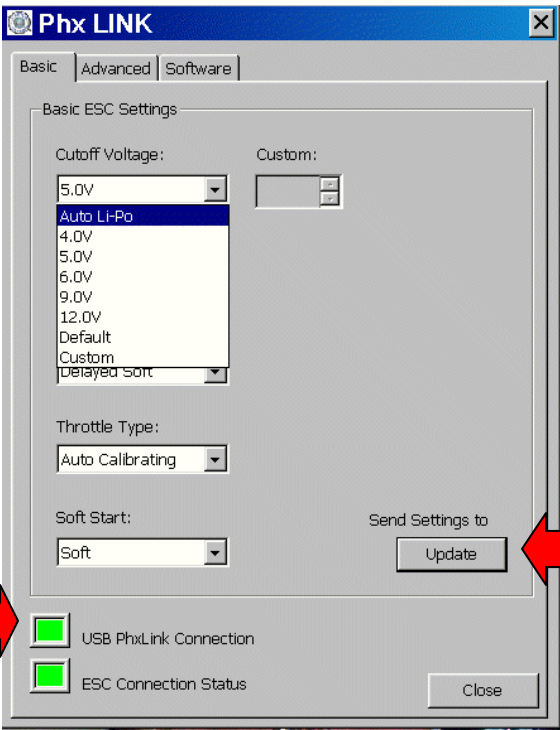


Explanation of PHX-Link Settings

PHX-Link Software with Controller Plugged Into Link



Note: If this box is red your Link driver is not installed. See the driver installation instructions*.

Note: Click update before changing to advanced or software tabs to save settings to controller

Once the Phoenix link software is installed, it is easy to program your controller. The following shows what each setting means.

Cutoff Voltage

- **Auto Lipo Detect:** When selected, the controller will detect the number of Lithium Polymer cells in series in your battery pack, and set the cut off voltage to 3 volts per cell. When you plug the battery pack into the controller, after the initialization tones the controller will flash and beep the number cells it counted, so you can confirm the controller setting. If the cell count is incorrect, make sure your batteries are charged and the correct cell count is flashed BEFORE flying.
Note: There are obvious problems using auto lipo detect with mixed lipo and NiMh or NiCad packs. An 8 cell NiMh pack will be detected as a 3 cell lipo pack but with a 9 volt cut off will cut off almost immediately. We recommend if you switch between Lipo and NiMh you set the controller for each pack separately.
- **4.0V, 5.0V, 6.0V, 9.0V, 12.0V:** The rule of thumb for Lithium Polymer is to set the cutoff voltage at 3 volts per lipo cell in series, I.E 2s = 6 volts, 3s = 9 volts etc. but always check your battery manufactures recommendations. Because NiCad and NiMh cells will quit flying your airplane before they can be damaged it is OK to set these cells for a 5 volt cut off regardless of the number of cells. 4 volt cut off should be used only for very low cell count applications.
- **Default:** Sets the voltage to the Castle Creations default of 5 volts
- **Custom:** When selected, the custom voltage box will become available, where you can enter any voltage you want in 1/10th volt increments between 6 volts and the maximum voltage for that controller.

Cutoff Type

- **Hard Cutoff:** When the battery pack reaches the cut off voltage set in the previous step, power is cut to the motor. You can throttle off and back up, and the motor will restart, but the motor will cut off again if you throttle up to the point where the voltage drops below cut off voltage. This is recommended for airplanes, and it provides the best protection for your batteries. **Note:** *If you are getting cut off before your batteries are drained, or before reaching full throttle, it is a good indication that your batteries are not up to the power demands of your system.*
- **Soft Cutoff:** When the pack reaches cut off voltage, power to the motor is reduced until pack voltage rises above cut off. Power is then continually modulated to maintain cut off voltage. The motor will appear to hunt for a set speed. This is recommended for helicopters and 3D flying, where a sudden loss of power is unwanted at the cutoff point.
- **Default:** Castle Creations default is Hard Cutoff.

Brake Type

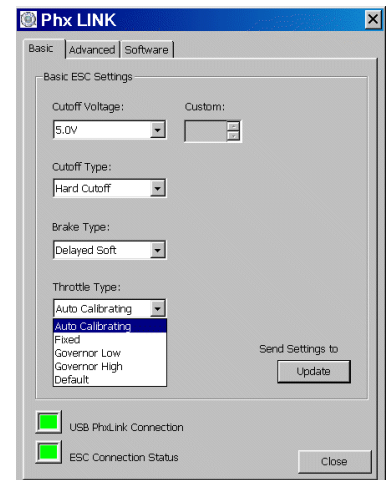
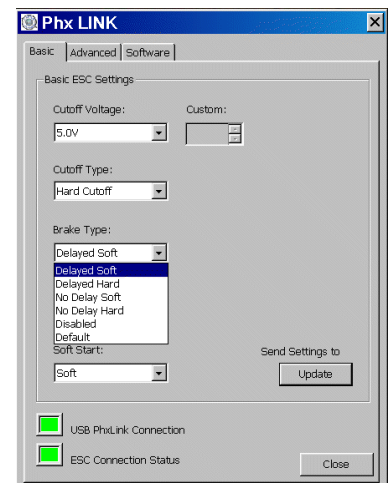
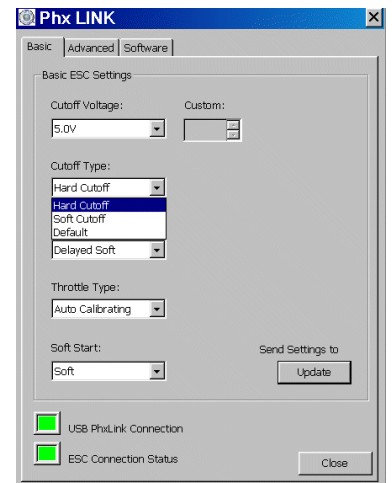
The brake is used to stop a folding prop on a glider to allow it to fold. Glider pilots should experiment to find which brake works best for their application. Most non-glider pilots prefer the prop to freewheel to control speed on downlines. Helicopter pilots will need to disable the brake.

- **Delayed soft.** Easy braking action after 4 second delay. The Castle Creations brake default
- **Delayed hard.** Hard braking action after 4 second delay.
- **No Delay Soft.** Easy braking action with no delay
- **No Delay Hard.** Hard braking action with no delay
- **Disabled.** No brake
- **Default.** Easy braking action after 4 second delay

Throttle Type

Throttle type is a primary safety feature. It is virtually impossible to have a motor start unexpectedly when you are in control of when the system arms.

- **Auto Calibrate:** (Not for helicopters). Works interactively with your transmitter to utilize its full throttle range. If selected you will need to calibrate the throttle every time after you arm the system. To use follow these steps:
 1. Turn your transmitter on with the throttle stick in a middle position. Plug your battery into the controller. You will get the initialization tones.
 2. Move the throttle to the bottom position to arm the system.
 3. If you wish to have full throttle range before flying move the throttle stick to the top position for at least 2 seconds to allow the controller to determine where the top stick position is. Note: motor will be running during this time. Otherwise, to ensure proper throttle range setting be sure to climb out right after launch at full throttle.
- **Fixed:** (Airplanes and helicopters). Uses predetermined fixed endpoints within the controller. To Use:
 1. Turn you Tx on with the throttle stick in the middle or top position. You get the initialization tones.
 2. Move the throttle to the low position to arm.
 3. With fixed throttle start and full throttle points will be determined by the end point settings on your transmitter (in most cases, throttle will start between 15% and 25% throttle, and will reach full throttle at 70% to 80% throttle. You can adjust your throttle endpoints on your Tx to get full throttle range. The throttle curve is the same as auto calibrate. To use fixed throttle with a



helicopter, set your throttle and pitch curves on your transmitter to match your flying style and the particular power system.

- **Governor Low:** (Helicopter only). Governor mode is used to hold a fixed head speed. Start with Governor Low and a low % straight across throttle curve on your Tx. Adjust the curve % up, until you get the head speed you want. As an example of a common flying setup, if the head speed you want occurs at 92% throttle, your 5 point throttle curve would be 0-92%-92%-92%-92%. Some prefer a 92%-92%-92%-92%-92% curve, and use the throttle hold/cut button to arm the controller. This will retain rpm at a full negative collective stick position for aerobatic flying. To use:
 1. Turn on the transmitter with the throttle in a middle or high position. When you plug the battery in you will get the initialization tone.
 2. When you are ready to fly, throttle off, or use the throttle hold/cut button to arm the system. When you throttle up, the head speed will come up slowly (governed) until it reaches the set head speed. Check your headspeed and adjust the throttle percentage as needed. When it reaches this speed, the controller is released to use as much power as needed (or available) to maintain the set headspeed. The throttle stick now only controls collective.
- **Governor High:** (helicopter only). Gives a higher head speed range. Use if Governor Low doesn't allow you to reach the desired head speed. Works the same as Governor Low.

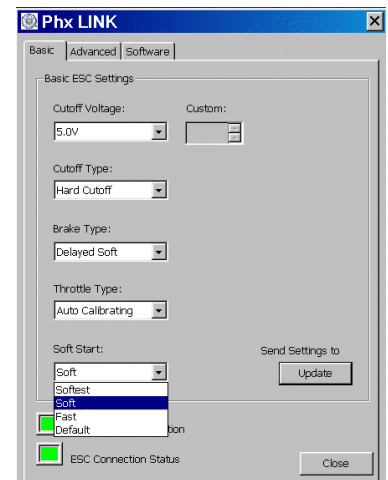
Alternate method of setup for Governor Mode: You can use a dial and an additional channel to run the motor in governor mode. Simply connect a non-throttle channel that is operated by a rotary dial to the speed control. Use the dial to throttle-up to desired head speed, and use the throttle/collective stick for collective only. This works well on helicopter setups when using an airplane radio.

Default Castle Creations default is Auto Calibrate

Soft Start

Soft Start controls the amount of power sent to the motor during the start up. While a slow start is desirable, many motor types will not start reliably if not enough power is applied to the motor. The only time you want to change this setting is if your motor is not smooth on start up. Soft start also effects how quickly the motor will respond to throttle changes across the throttle range.

- **Softest:** Applies the least amount of power to the motor on start up. May not work with all motor types. When selected, motor response when changing throttle position will be damped. Spool up speed in governor mode is slowest.
- **Soft:** Castle Creations default. Balances start up and throttle advance speed for most motor systems. Spool up speed in governor mode is medium.
- **Fast:** Gives quickest start up and fastest throttle response. This setting will start motors that may have difficulty with the default setting. Spool up is fastest. Throttle response is least damped.

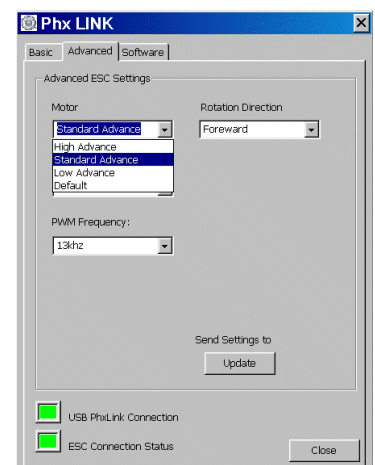


Advanced Tab

Unless you have good reasons and know what you are doing, we strongly recommend you not change settings in the advanced tab. Castle Creations has carefully considered the default settings in the advance section to provide the best performance for all power systems. Change these setting at your own risk. **Exception:** The reverse rotation setting can be used without any risk to motor or controller.

Motor

Motor settings change the timing advance of the motor. Generally, low advance gives more efficiency and less power, high advance gives more power at the expense of efficiency (motor heat). Standard advance gives the best balance between power and efficiency. Every system will respond to changes in advance differently. If you decide to experiment with changes to timing advance, use a wattmeter, a



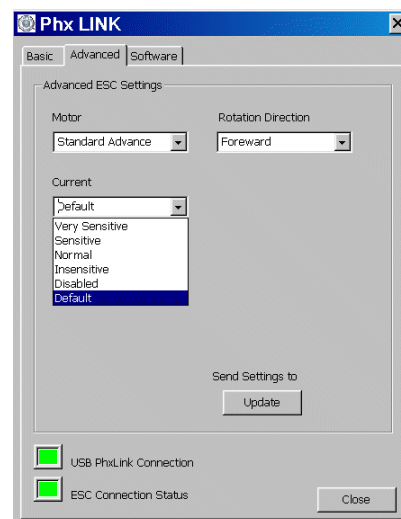
tachometer, and a temp gun to find out how such changes affect your system. Remember, less efficiency or more power always means more heat.

- **High Advance:** Most advanced timing setting. Most power in most cases, but at the expense of added motor heat and lost efficiency.
- **Standard Advance:** Normal setting. Recommended for all systems as the best mix of power and efficiency
- **Low Advance:** Lowest advance setting. Useful for gaining extra flight time, or reducing motor heat in certain applications.

Current (Helicopter)

Castle Creations controllers have several forms of built in protection, one of which is 'Current'. This setting changes how the controller protects itself from over current. Generally, for aircraft use, there is no reason to change this setting except to experiment. Helicopters using governor mode can put incredible load spikes on the system, and will benefit from changing this to insensitive or disabled. However this will increase the risk to the controller from over current.

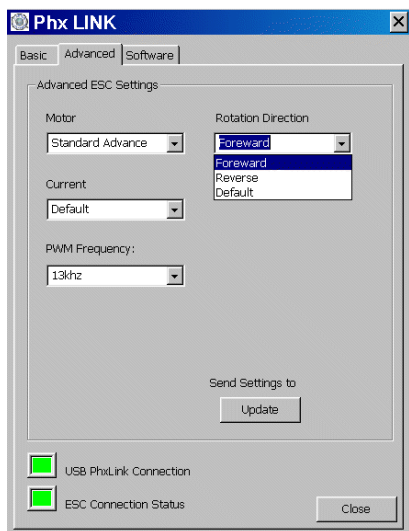
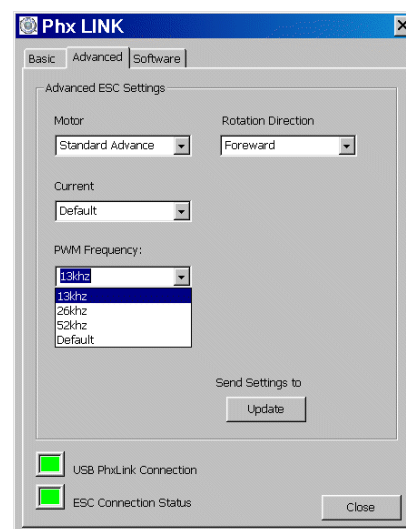
Using a battery of too low a discharge capacity can sometimes engage this protection feature by creating ripple current. If you are getting premature cutoffs, and changing this setting to disabled cures them – look closely at your pack and connectors to be sure they are adequate for your application.



PWM Frequency

This setting changes the frequency with which the controller sends power pulses to the motor. With some motor types, the higher the frequency the more efficient the motor will run but at the expense of increased heat in the controller. If you decide to experiment with changes to PWM use a wattmeter, a tachometer and a temperature gun to find out how changes affect your entire power system.

An increase in PWM frequency will always increase the controller temperature. It may or may not decrease the temperature of the motor.



Rotation

When you power up the motor for the first time and it spins in the wrong direction you can change the direction here instead of having to switch two motor wires. This allows you to solder you controller to the motor without worrying about having to change it. (This setting can be changed without any risk to the controller or the motor. Timing will be automatically corrected for the direction of rotation.)

***Driver installation instructions (if USB Connections light is red)**

1. Click Start and go to 'Settings' then 'Control Panel'
2. Double click on 'Add Remove Hardware'
3. Let windows know the hardware is already installed (make sure the link is plugged in), click next
4. Find the PHX-Link on the hardware list and select it, click next
5. Windows will tell you the hardware has a problem, click 'Finish' to start the driver installation wizard
6. Select 'Include this Location in Search' and type in this location
 1. [c:\program files\phx-link\driver], or use the browse button to brows to this location. click next
 7. Windows will tell the driver is not certified, click continue while thanking us for not asking you to pay for a windows cert.
8. Click finish